passive house+

eco build & upgrade

formerly ConstructIreland
for a sustainable future

Kilkenny passive house inspired by us

the leading source for:
insulation | airtightness | renewable energy | triple glazing
ventilation | green materials | water conservation + more

Issue 1 Volume 1 €4.75 | £3.95
ISSN 2009-5260

€500.00 voucher for Alpha-Innotec heat pump or Polytherm under-floor heating system.
Please see our web site for full details of our offer: www.origen.ie

HARNESS THE POWER OF NATURE

80% Lower Heating Costs[1]

With Heat Pumps from Alpha-InnoTec

Alpha-InnoTec Heat Pumps

Alpha-InnoTec is one of the leading specialist heat pump manufacturers in Europe and are now stocked exclusively in Ireland by Origen.

Heating accounts for about half of total energy use and carbon emissions. The latest generation of heat pumps provide highly efficient heating,hot water production and can even produce cooling during the summer if required.

- Up to 80% lower heating costs[1]
- Independent of oil and gas
- Minimal operating and maintenance costs
- Ideal for new construction and modernisation
- Potential to be CO_2 Neutral

Find Out More

Origen Energy is one of Ireland's leading renewable energy and district heating specialists. Origen design and supply fully engineered renewable energy solutions to the residential, commercial and industrial sectors, that lower energy costs.

Contact our team for more information at:

Origen Energy Limited,
Naas Road,
Dublin 12. Tel: 01 419 1940
Email: energy@origen.ie
www.origen.ie

Partners with Hevac

origen

(1) Water-Water Heat Pump V's Electric Heating. Comparison correct at time of print.

editor's letter

Welcome to the inaugural issue of Passive House Plus.

I can scarcely believe we've come to the point where it's possible to type those words. It's been roughly a year since my colleagues and I at Temple Media Ltd first seriously contemplated rebranding Construct Ireland, a magazine we were very much invested in after almost a decade of publishing. As we explained in the final issue of Construct Ireland back in August – and as our many loyal readers know – Construct Ireland was a sustainable building magazine from the word go, albeit one with a title that betrayed our sense that a stealthy approach was necessary if we were to avoid alienating an industry paying scant regard to sustainability.

Such stealth is neither needed nor useful now. Instead an industry that has sunk to its lowest ebb needs new direction, new impetus, and new inspiration. It should therefore embrace passive house as part of a rigorous approach to sustainable building.

There's an important point here, and one that relates to this magazine's new title. We must not allow our pursuit of passive house to distract us from the need to make buildings that are sustainable in the round. Some readers will be concerned that our emphasis will shift to reducing energy consumption to the greatest extent possible, and that we'll disregard other aspects of sustainable building. That's not the case.

In fact we should be pursuing the principles and rigorous approach that underpins passive house precisely because it addresses other aspects of sustainable building that risk being compromised by less considered energy efficiency strategies. So passive house pursues such exacting approaches to airtightness, cold bridging and ventilation not just because of the dividend this provides in terms of comfort, energy and carbon saving, but because it protects the building from the elements outside and the element inside, resulting in a more durable building, which means the energy, carbon and resources embodied in its construction are locked in for the benefit of future generations.

My colleagues and I hope you enjoy this first issue of Passive House Plus, however you came across it. If you find the information in the painstakingly assembled collection of articles and adverts in this magazine useful, we urge you to share it with others. If you're planning to build or upgrade why not fill out the enquiry form on page 20 – tell us about your project, get talking to some of the leading names in sustainable building, and flag your project to us for a possible case study in these pages once it's finished. Best of all, fill in the subscription form on page 88 and we'll post you the six issues of Passive House Plus to be published over the next year – plus free access to the online versions of our Irish & British editions –for just €25.

Regards,
the editor

Jeff Colley:
winner - green leader award - Green Awards 2010

Construct Ireland:
winner - green communications award - Green Awards 2010

Jeff Colley: finalist - green leader award - Green Awards 2008

Finalist in seven categories at the Irish Magazine Awards 2009 including:

Construct Ireland - business to business magazine of the year; Constructireland.ie - business to business website of the year; Jeff Colley - business to business editor of the year; Lauren Colley - business to business designer of the year; Lenny Antonelli - journalist of the year; Construct Ireland - business to business magazine front cover of the year

Construct Ireland - finalist - business to business magazine of the year - Irish Magazine Awards 2008

Magazines Ireland

FSC Mixed Sources

ÉASCA
ENVIRONMENTAL & SUSTAINABLE CONSTRUCTION ASSOCIATION

Passive House Plus is the official magazine of Éasca, the Environmental & Sustainable Construction Association

I1 V1

PUBLISHERS: Temple Media Ltd.
PO Box 9688, Blackrock, Co. Dublin

T: (01)2107513 / (01) 2107512
Email: info@passivehouseplus.ie
www.passivehouseplus.ie

EDITORIAL

EDITOR: Jeff Colley
E: jeff@passivehouseplus.ie

DEPUTY EDITOR:
Lenny Antonelli
E: lenny@passivehouseplus.ie

John Hearne

CONTRIBUTORS

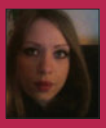
Tomás O'Leary, *Passive House Academy*
Pat Barry, *Irish Green Building Council*
Martin Murray, *PHAI*
Jay Stuart, *DWEcoCo*
James Walsh, *Low Energy Design*

IT / WEBSITE

Dudley Colley
E: dudley@passivehouseplus.ie

ACCOUNTS

Oisin Hart
E: oisin@passivehouseplus.ie



ART DIRECTOR

Lauren Colley
E: lauren@passivehouseplus.ie

PRINTING: W&G Baird,
T: 048 9446 3911
www.wgbaird.com

Publisher's circulation statement: 12,000 copies of Passive House Plus are printed and distributed to the leading figures involved in sustainable building in Ireland including architects; consulting, m&e and building services engineers; developers; builders; energy auditors; renewable energy companies; environmental consultants; county, city and town councillors; key local authority personnel; and to newsagents nationwide via Easons.

Cover: Kilkenny uncertified passive house
Photograph: bNEW Photography

ABC

ABC Certified Average Net Circulation of 7,223 for the period 01/07/11 to 30/06/12
(Under the former title of Construct Ireland)

win €3,000 of low carbon concrete for your house build

Enter for free at www.lowcarbonconcrete.ie/competition†

ECOCEM is the lowest* CO_2 cement for the most sustainable concrete

ECOCEM

WINNER GREEN AWARDS 2011 The Green Product Award

WINNER GREEN AWARDS 2012 The Green SME Award

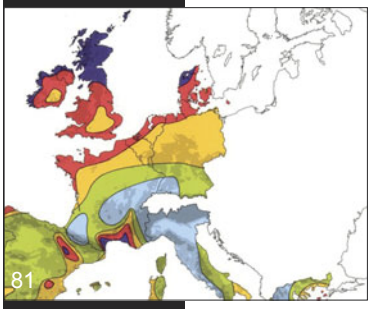
ECOCEM's carbon footprint is 25 times smaller than CEM 2 cement

* The carbon footprint of Ecocem cement is 29kg CO_2/tonne, audited by NSAI to ISO 14064-1:2006. The carbon footprint of CEM 2 cement is 750kg CO_2/tonne, according to Cement Manufacturers of Ireland, May 2011.

www.ecocem.ie
www.lowcarbonconcrete.ie

† Terms and Conditions: Apply for free – prize can be won for your own project or for your clients project. See other terms and conditions on entry form.

contents



News

Passive house should be national building standard, says industry group

Photo: Energyquarter

The Passive House Association of Ireland has called on the government to adopt the passive house standard as the national minimum building standard for Ireland, and to support "a series of passive house exemplary buildings across the country".

The organisation made the call last month at the tenth annual See the Light conference on low energy and sustainable building, which the association organised this year.

"There would be a significant benefit to Ireland were the country to adapt the passive house standard as a national standard," said architect and PHAI chairman Martin Murray, "both in regard to promoting Ireland's role in energy leadership and in creating and retaining jobs in an energy based economy."

Murray said legislating for sustainable design and construction was necessary to protect the low energy building expertise and talent that has been developed in Ireland over the past few years.

He also stressed that the window of opportunity to take advantage of Ireland's status as an early adopter of the passive house standard was limited. But he said that by adopting passive house as a national standard Ireland "could generate real job creation, create low energy buildings with real scientific technical underpinnings and develop an international reputation for being an energy world leader.

"The benefits to Ireland, as a sovereign state, to be the first to make passive house its national low energy design standard, would be to enable the country to make a significant mark on the international stage," he said.

The keynote speaker at the conference was Ms Joke Dockx, an engineer at the Brussels Environment and Energy Department, who spoke about the city's plans to make passive house the regional standard from 2015. She said the decision was the culmination of 18 years' progression towards low energy design.

The conference was supported by the RIAI, the Passive House Academy and the organisers of the Self Build Exhibition, which ran concurrently.

(above) self builder Francis Clauson presenting his experiences from aiming to build to both the passive house standard and to achieve an A1 Building Energy Rating, the highest rating attainable under the Irish state's energy efficiency scale

CBRE launches $1m fund to green commercial buildings

Leading global commercial real estate firm the CBRE Group has announced the launch of its Real Green Research Challenge (RGRC), a four-year, $1 million commitment to fund cutting edge sustainability research and innovation in the commercial building sector. The competition is open to entries from Ireland and throughout the EMEA (Europe, Middle East and Asia) region.

CBRE is now accepting submissions for research proposals, with the goal of developing solutions to the industry's critical environmental challenges. The types of research the RGRC programme will fund include productivity studies, large-scale predictive modelling, energy efficiency technologies, data management programmes and diagnostic tools.

Selected applicants will receive up to $250,000 for basic research and implementation, with the first successful proposals expected to receive initial funding in February 2013. In addition to monetary funds, RGRC-funded projects will have access to CBRE's global market data, and resources to help them to commercialise their ideas.

"We've seen growing market awareness of commercial buildings' impact on the environment," said Bob Sulentic, CBRE's President. "This has inspired new thinking and innovation in sustainability research. However, people with good ideas often lack financial support and access to real-time market data and insight into building construction, occupancy and management that only a global firm like CBRE can provide. Our RGRC programme will help to unleash innovation by connecting ideas with funding and CBRE's unparalleled information and people resources."

CBRE has assembled a panel of internal and external global experts to evaluate research proposals. The judges include members of academia, non-governmental organisations and industry.

"Commercial buildings can generate serious environmental impacts for both current and future generations. However, smart research and innovation can significantly reduce these impacts," said Mark Kenber, CEO of The Climate Group. "Therefore we support CBRE's efforts with the RGRC and applaud its commitment to bringing its resources to bear for positive environmental change."

Full details about the RGRC, its evaluation criteria, and terms and conditions are available at www.cbre.com/rgrc. Submissions will be accepted via the website until 31 December 2012.

News

PassiveHousePlus.ie goes live along with new online edition

If you're reading this online, then this won't be news to you – Passive House Plus is available in an online version to compliment the print edition.

The online version will be a complete edition of the magazine, including embedded links in advertising, and will be available permanently for subscribers.

The online edition will be available through our website, www.passivehouseplus.ie. All subscribers to either the Irish or UK print edition will receive a free online subscription to both editions. A reduced online-only subscription rate will also be available.

"The online edition of the magazine will be just one part of the new Passive House Plus website, which will include blogs by our journalists and guests, up-to-date news, a sustainable building glossary and our popular discussion forums," said Passive House Plus IT manager Dudley Colley. "What's more, the entire archive of feature articles from our predecessor magazine Construct Ireland's website will remain free to everyone on the new Passive House Plus website."

"Readers will also be able to comment under articles, and the site will be integrated with social networks like Facebook and Twitter," he said.

The first issue of Passive House Plus is expected to achieve a significantly higher circulation than any edition of Construct Ireland, which itself had the highest recorded circulation of any Irish construction magazine. Five thousand copies will be distributed to quality newsagents in the Republic of Ireland, with a thousand copies going to Northern Ireland newsagents for the first time. Six thousand copies will be distributed to people involved in sustainable building throughout Ireland, including thousands of people involved in live, current building & upgrading projects.

Passive House Plus will be published in separate UK and Ireland editions in December.

'Solar skins' forum in Italy this December

The seventh annual Energy Forum on solar building skins will take place in the northern Italian town of Bressanone on 6 and 7 December.

Tilmann Kuhn, head of the department for solar façades at the renowned Fraunhofer Institute for Solar Energy Systems in Freiburg, Germany, will present new solar components for integration into the building envelope at the conference.

"From 2020, new EU laws will require new buildings to be constructed in such a way that they actually achieve a zero energy balance," he said. "In smaller buildings this can be achieved easily with the help of insulation and solar systems on the roof." Kuhn said that roof space limitations become a significant issue in larger buildings, with the lack of space meaning insufficient energy can be generated to help meet the larger energy demands that tend to occur in larger buildings.

"This is where the entire building skin, including the façade, becomes interesting, especially from an economic point of view," he said. "Demand for surfaces that can be used to produce solar energy is rising. The huge surface area of building skins can be used most effectively to produce cost-effective energy with the help of photovoltaic and solar thermal systems."

Photo: Ertex Solar, Austria

Apart from the newest developments in solar energy technologies and solar skins, participants will be introduced to case study projects, as well as software and planning tools for the simulation of passive houses. For a detailed programme and information on registration visit www.energy-forum.com

(above) the latest developments in the utilization of solar energy will be presented and discussed at the 7th Energy Forum in Bressanone

News

HPA: it's official, heat pumps offer the lowest running costs

Domestic Fuels

Comparison of Useful Energy Costs for Space Heating

1-Jul-2012

Fuel [14]	Form	Delivered Energy Cost [14] (c/kWh)	Seasonal Efficiency Ratings [14] 100%	90%	80%	70%	60%	50%	40%	30%	20%
Peat	Briquettes, Baled	5.82					9.70	11.64	14.55	19.40	29.10
Coal	Nuggets (Lignite)	5.64					9.40	11.28	14.10	18.80	28.19
	Premium Coal	4.42					7.36	8.83	11.04	14.72	22.08
	Standard Coal	4.43					7.38	8.86	11.08	14.77	22.15
	Standard Anthracite [15]	4.98					8.30	9.96	12.45	16.60	24.90
	Grade A Anthracite [15]	5.30					8.84	10.60	13.25	17.67	26.51
	Ovoids (Smokeless)	4.63					7.72	9.27	11.58	15.44	23.16
Oil	Gas Oil	8.58		9.54	10.73	12.26	14.31	17.17			
	Kerosene [16]	8.39		9.32	10.48	11.98	13.98	16.77			
L.P.G.	Bulk L.P.G.[17]	12.37		13.74	15.46	17.67	20.61	24.74			
	Bottled Butane	21.44		23.82	26.79	30.62	35.73	42.87			
	Bottled Propane 34kg	19.21		21.35	24.02	27.45	32.02	38.43			
	Bottled Propane 47kg	18.94		21.04	23.67	27.05	31.56	37.88			
Natural Gas	Band D1: <5,556 kWh per annum	7.19		7.98	8.98	10.27	11.98	14.37	17.97	23.95	35.93
	Band D2: >=5,556 <55,556 kWh per annum	6.18		6.87	7.73	8.83	10.31	12.37	15.46	20.61	30.92
	Band D3: >=55,556 kWh per annum	5.73		6.37	7.16	8.19	9.55	11.46	14.33	19.10	28.65
Electricity	Band DA: <1,000 kWh per annum	52.94									
	Band DB: >=1,000 <2,500 kWh per annum	25.03	25.03								
	Band DC: >=2,500 <5,000 kWh per annum	20.86	20.86								
	Band DD: >=5,000 <15,000 kWh per annum	18.53	18.53								
	Band DE: >=15,000 kWh per annum	15.53	15.53								
	Night rate	8.52	8.52								
Wood	Pellets Bulk Delivery	5.02		5.58	6.27	7.17	8.37	10.04	12.55		
	Pellets Bagged	6.62		7.35	8.27	9.46	11.03	13.24	16.55		
	Briquettes	7.93		8.81	9.91	11.32	13.21	15.85	19.81	26.42	39.63

Typical Seasonal Efficiencies[22]

Open Fire, Solid fuel or Gas DFE [18]	
All	20-30%
Open Fire with High Output Back Boiler	
All	35-50%
Stove / Closed Room Heater (without Back Boiler)	
Peat	45-55%
Coal	50-60%
Gas	65-75%
Stove / Closed Room Heater (with Back Boiler)	
All	60-85%
Oil Fired Boiler	
Gas Oil	55-75%
Kerosene	60-75%
Gas Fired Boiler	
All	65-75%
Wood Product or Biomass Boiler	
All	60-87%
Flueless Gas [19]	
All	90%
Condensing Boiler	
	85-97%
Electric Storage Heater	
All	90%
Electric (Electric Fire, Panel Heater)	
All	100%

	Electricity used for Heat pumps[20]	Delivered Energy Cost [14] (c/kWh)	Seasonal Performance Factor (SPF) [21] for heat pumps 2.5	3	3.5	4	4.5	5	5.5	6
Electricity	Band DA: <1,000 kWh per annum	52.94	21.18	17.65	15.13	13.24	11.76	10.59	9.63	8.82
	Band DB: >=1,000 <2,500 kWh per annum	25.03	10.01	8.34	7.15	6.26	5.56	5.01	4.55	4.17
	Band DC: >=2,500 <5000 kWh per annum	20.86	8.34	6.95	5.96	5.21	4.63	4.17	3.79	3.48
	Band DD: >=5,000 <15,000 kWh per annum	18.53	7.41	6.18	5.29	4.63	4.12	3.71	3.37	3.09
	Band DE: >=15,000 kWh per annum	15.53	6.21	5.18	4.44	3.88	3.45	3.11	2.82	2.59
	Night rate	8.52	3.41	2.84	2.43	2.13	1.89	1.70	1.55	1.42

Typical SPFs for Heat Pump Types[22]

Ground source (horizontal)	2.7 - 4.5
Ground source (vertical)	2.7 - 4.5
Air/Air	2.5 - 4.2
Air/Water	2.5 - 4.0
Water/Water	3.0 - 5.6
Exhaust Air	2.5 - 4.2

The Sustainable Energy Authority of Ireland has introduced estimated running costs for heat pumps into its monthly domestic fuel costs report.

SEAI's July fuel cost report includes a section on electricity used by heat pumps for the first time, highlighting the difference in estimated operating costs for heat pump technology over other fuels.

Responding to the report, the Heat Pump Association of Ireland (HPA) said that the figures confirmed that heat pumps are the cheapest form of heating.

Oil burnt at 80% efficiency - perhaps the most commonly achieved average – costs an estimated 10.73 cents per kilowatt hour (kWh), reducing to 9.54c at 90% efficiency. Bulk LPG at 80% efficiency costs 15.46c per kWh, while bulk wood pellets at 80% efficiency cost 6.27c per kWh.

For homes on the natural gas grid, and on the band D2 rate, the cost is 7.73c per kWh at 80% efficiency.

Heat pumps with a listed average seasonal performance factor of 4, (day rate electricity band DD) score at 4.53C per kWh for band DD day rate electricity, falling to a mere 2.13C per kW on night rate.

"Most heat pump installations run on a 50/50 mix of night and day rate electricity which would therefore average out at 3.33cent per kWh," a HPA spokesperson said.

"In money terms an average bungalow in Ireland using 30,000 kWh would currently cost €999 with a heat pump." The spokesperson said that meeting the same energy supply from oil at 80% efficiency would cost €3,219. "An annual saving of €2,220 is possible," he added.

(left) an extract from SEAI's domestic fuel cost comparison sheet for July 2012

Clarification

The A2 rated eco house in Mayo featured on the front cover of the final issue of Construct Ireland, ("Mayo house blitzes latest energy efficiency standards", pp46-54) featured an editorial error.

The project was designed by Axo Architects, but the name of the project architect and designer – Helena McElmeel – was omitted due to an editorial oversight.

Temple Media Ltd had been notified by Axo Architects of Helena's central role in the project, and apologises for any inconvenience caused.

News

Leading green architect & contractor launch design & build venture

Leading green architect Miles Sampson and contractor Niall Dolan of GreenTec Homes have joined forces to launch Quality Eco Homes, a new company that will offer complete sustainable design and build service.

QE Homes can offer a complete service if required, from sketch design and planning permission to construction, landscaping and furnishing.

The company is offering low energy timber frame homes with an emphasis on green materials.

"There's a lot more efficiency to be gained in streamlining the whole service," architect Miles Sampson told Passive House Plus. "Everybody is working as a team already."

He said QE Homes can work to a budget from the start of the project, making it easier for clients to control costs. The company is offering a nationwide service.

"From the minute the client sits down with us we're already thinking about passive levels of building, and we're thinking about how to do it on their budget."

QE Homes is currently nearing completion on its first home near Kinvarra, Co Galway. The house features wide timber frame walls with 300mm of cellulose insulation.

(right) meticulous airtightness installation at the QE Homes build in Kinvarra, Co Galway. The house has clocked an impressive airtightness test result of 0.52 air changes per hour at 50 Pascals

Trade show to showcase green build & retrofit

Now in its seventh year, the Sustainable Building & Retrofit Show will take this place on 10 and 11 November in the Industries Hall at the RDS, Dublin.

The show will present visitors with the latest products, technologies and information relating to green building and retrofit.

The show will highlight the increased focus on sustainable building and retrofitting within the construction sector.

A series of seminars, organised by leading sustainability organisation Cultivate, will include talks on ventilating a home without losing energy, the cost of solar thermal and photovoltaic systems, and a case study of a passive house in Kerry.

Puchasers and specifiers visiting this business-to-business trade event will include building contractors, architects, planners, quantity surveyors, engineers and local authorities through to plumbers, joiners and self builders.

The OldBuilders Company will run a clinic offering advice on the correct methods and specifications for restoring old buildings.

The show is also purchasing carbon credits from Ecocem to offset its carbon emissions.

Some of the exhibitors will include Ancon Building Products, Wienerberger poroton block distributor Brick Sales Ltd, Ecocem Ireland, Energy Saving Systems, IGOE International, Mellot Windows, the OldBuilders Company and Watersave Ireland.

Passive House Plus magazine is one of the event's supporters, along with the Construction Industry Federation, the Chartered Institute of Building, the Architectural Association of Ireland, Cultivate and Modern Builder magazine.

(above left) visitors at a previous Sustainable Building Show

Photo: Shane O'Neill/Fennell Photography

News

Scandinavian Homes pass 50 passive house mark

Photo: Lars Pettersson

Galway-based passive house specialists Scandinavian Homes has just completed their 51st Irish project to the passive house standard, at Spiddal, Co Galway. The company's Lars Pettersson told Passive House Plus magazine that there's never been a more cost-effective time to build a passive house.

Pettersson said that clients are choosing to build modest-sized homes compared to previous years, making it much more affordable to go passive.

He said the company's 160 square metre Nordica 94 timber frame house is particularly popular at the moment, with two recently finished, a third about to be built. "It's a massively price-effective shape for a passive house, and at a budget that's affordable for most people," he said.

He stressed that the key to the passive house concept is simplicity. "This means that the general shape of the house needs to be considered at an early stage," he said. "Customers most often design their houses themselves with a little help from our passive house architect. The original passive house concept envisioned simplicity in heating arrangements."

He said his clients are seeking energy independence by installing a small multi-fuel stove, which he said can easily heat a passive house in combination with heat recovery ventilation.

"We focus only on the 10 watts per square metre peak heat. If we focus on that, everything else falls into place. It's not terribly difficult to achieve that in Ireland," he said.

Pettersson said that a Scandinavian Homes built "super passive" house at Loughrea, Co Galway achieved an airtightness test result of 0.27 ACH. The house features 700mm of cellulose insulation in the attic, and 335mm of Paroc mineral in a double-stud timber frame wall system. Homeowner Declan Cunningham kept a blog about construction of the house at www.h214dcu.blogspot.ie

(above) Declan Cunningham's "super passive" house at Loughrea, Co Galway, built by ultra low energy building specialists Scandinavian Homes

UK Passivhaus Conference to hit Nottingham in November

Photo: Andrew Perrin for the Passivhaus Trust

The UK Passivhaus Conference takes place on 7 and 8 November, 2012 at the East Midlands Conference Centre at the University of Nottingham.

Organised by the Passivhaus Trust, the conference includes leading industry speakers from across the UK and Europe, UK passive house case studies, and an optional third day of visits to passive buildings. These include Interserve's passive house office in Leicester, plus a passive primary school and residential scheme. There will also be an exhibition of passive house products and services.

Currently there are over 100 certified passive dwellings in the UK and about 20 certified non-domestic projects, Passivhaus Trust chief executive Jon Bootland told Passive House Plus. This includes five schemes of approximately 20 dwellings each, both in the private sector and social housing.

"In addition, we also know about several schemes in planning that will deliver over 50 certified dwellings, so we expect the number of completed Passivhaus buildings to approach 500 by the end of 2013 or early 2014," he said.

Last year's Passivhaus Conference attracted over 250 attendees and 25 exhibitors. There was a waiting list for the second day, which was completely sold out.

The conference is geared towards all construction and built environment professionals, including architects, planners, building control officers, energy managers, builders, housing associations and researchers.

A one day ticket this year costs £195 plus Vat, while a two day ticket costs £330 plus Vat. Dinner and site visits are extra. Preferential rates are available for Passivhaus Trust members and students. For more information see www.passivhaustrust.org.uk

(above) BRE director Nick Tune speaking at the first day of the 2011 Passivhaus Conference

News

Ireland unlikely to meet EU energy targets — Serve

Photo: David Ruffles

Ninety thousand Irish buildings will need to undergo significant energy upgrades every year up to 2020 if Ireland is to achieve its legal obligations under the EU Energy Efficiency Directive, which was adopted by the European Parliament on 11 September 2012 and is expected to come into force in November.

EU member states will eventually face fines if they fail to comply with the new directive, which is aimed at driving energy efficiency improvements in households, industries and transport sectors.

According to research conducted by the Tipperary-based Serve (Sustainable energy for the rural village environment) project, one million Irish buildings will be required to undergo energy upgrades by 2020 in order to comply with the directive and the national energy retrofit programme.

Serve warned, however, that Ireland is unlikely to meet the target in light of its research indicating that less than 50,000 buildings will undergo energy upgrades in 2012. The group pointed to a reduction in government grant levels, the lack of public investment in energy efficient projects due to the economic downturn, and lowering public support for energy efficiency measures as the main factors behind the disappointing figure.

The project's research has found that fewer Irish people feel that the environment is a priority due to the economic crisis. In 2010, 37% of those asked felt that the environment should be given priority over competitiveness, whereas this has reduced to 25% in 2012.

The EU-funded Serve project carried out its research in the context of a five-year project in north Tipperary that has delivered an investment of €10.5m in sustainable energy in the region. The project has resulted in 400 buildings receiving significant energy upgrades, and the development of an eco-village in Cloughjordan that is 100% supplied by a renewable heating system, and has the largest solar array (506 sq m) in Ireland.

"Unless there is government intervention, Ireland faces possible EU fines and a situation whereby Irish householders and businesses will continue to waste millions of euro each year on heating poorly insulated and energy inefficient buildings," said Seamus Hoyne, manager of the Serve project. "Only full implementation of the national energy retrofit programme, development of alternative financing measures, increased public investment in energy efficient projects, and a national shift in opinion in favour of energy efficiency measures, will ensure Ireland achieves its legal obligations under the EU Energy Efficiency Directive.'

"Analysis of energy savings of 300 homes which completed upgrades, showed approximately €200,000 was saved in energy consumption," he said. "If this level of savings was applied to all Irish homes the total savings would be €1bn per annum." Monitoring of energy consumption of 100 houses has also shown some startling results, Hoyne said, adding that electricity wasted by leaving appliances on standby could save €35 per home every year.

"The rate of return for the investment in sustainable energy for houses in the Serve region was 10%, which is significantly better than the average rate of return in a deposit savings account. With increasing fuel prices the rate of return will increase further, making energy efficiency a sound investment," Hoyne said. "Furthermore, homes which have poor insulation levels not only lose energy but are also uncomfortable for residents. Our analysis has shown that during major changes in external temperature (from 20C to 3C), the internal temperature only changes by 2C in a well-insulated house."

He added that investment in biomass heating for commercial and public buildings could save the exchequer hundreds of thousands of euro. "An investment of €205,000 in a biomass heating system at a public pool in the Serve region has resulted in annual savings of €25,000 to €30,000. Assuming all pools and leisure centres which are off the natural gas grid were to make similar investments, one job will be created per €250,000 invested," Hoyne concluded.

LIT Tipperary has been the manager of the Serve Project, whose partners include North Tipperary County Council, Sustainable Projects Ireland Ltd and the Tipperary Energy Agency

(above) a house in the Serve region being measured prior to energy upgrade work taking place

There's more to Forbo...

Besides being world leaders in linoleum, and renowned as the innovators of Marmoleum, Forbo also offer a comprehensive range of flooring solutions and can supply exactly what you need to create beautiful high performance floors in every part of your building.

Project Vinyl

Forbo's design studio has incorporated a rich and diverse mix into the development of the new Heterogeneous Project Vinyl collection, to deliver a relevant and contemporary range of vinyl floorcoverings.

Flotex Flocked Flooring

Flotex is a truly unique electrostatically flocked floor finish that combines the most attractive features of both carpet and resilient floors, without any of the drawbacks.

Entrance Flooring

Entrance Flooring Systems are fundamental to modern building design – minimizing maintenance costs, maintaining the building's appearance throughout the day and protecting its flooring and environment from pollutants and dirt.

Carpet Tiles

Tessera and Westbond carpet tiles are renowned for their aesthetic styling and outstanding performance in the most demanding heavy traffic environments.

www.forbo-flooring.ie

creating better environments

forbo
FLOORING SYSTEMS

News

Isover launches new G3 Touch mineral wool

Isover Ireland has launched its new G3 Touch mineral wool insulation, with an Isover road show calling to merchant stores and insulation installers nationwide.

Isover Ireland boss and Saint Gobain Construction Products Ireland managing director Brian Dolan said that G3 Touch is a “new generation mineral wool, high performance with excellent thermal properties and gentle to install.”

The product is a space saving mineral wool insulation specifically for domestic attic floors. “It still has the same great Isover product performance with excellent mechanical strength and recovery,” Dolan added.

“Our new generation mineral wool is gentle to install, so it’s much softer and nicer to work with. With airborne dust reduced by over 70%, it creates a pleasant working environment for installers.”

The product is manufactured from 86% recycled materials. The company has also launched a website for G3 touch, which includes a video showing a full attic floor installation, and gives installers the opportunity to post photos or videos of their own installations to Facebook. The site is at www.Isover-g3touch.ie

Call for entries – 2013 Energy Efficiency awards

The company has also launched its 2013 Energy Efficiency Awards, and is calling for entries before the 1 November deadline. The awards are open to building professionals such as architects, engineers or contractors, and to developers.

Dolan said the company is calling on projects that "set the standard in energy efficient design, whether in renovation or new construction projects" to enter the competition.

The awards were created to “honour and encourage those who are doing outstanding work in the area of energy efficient construction and renovation,” he said, adding that the company is looking for projects that set the standard in energy efficient design, whether in renovation or new construction projects.

“It’s amazing how renovated buildings can achieve the standards of very low energy buildings thanks to architects' creativity and expertise,” he added.

Dolan said that in the renovation category they were looking for projects “where all building professionals have to create efficient solutions to save both energy and money while facing complex challenges”.

To be eligible, projects must use at least one Isover product and must demonstrate substantial energy savings. Renovation projects must at least cut energy consumption in half, while new build projects “must achieve the minimum energy requirements for very low energy building standards”. Full competition rules are available at www.isover.ie

The top project will be selected by a local jury of industry and technical expects, and will receive a cash prize of €5,000. The two runner-up projects will win a cash prize of €1,000 each.

Winning projects will also feature in Isover's Best Of Book, which aims to promote outstanding European projects in energy efficiency design, in order to share building knowledge and practice across the continent.

(above) Isover’s new G3 Touch mineral wool hits the streets. The Irish winners from the 2011 EEA awards included Michael Bennett & Sons and Shoalwater Timberframe’s certified passive house in Co Wexford, Randy Ralston and Integrated Energy’s A1 rated refurb in Co Wicklow, and BDP’s renovation of the Carroll’s factory for Dundalk Institute of Technology

News

Nu Flow offers smart green solution to leaking Cork sewage pipes

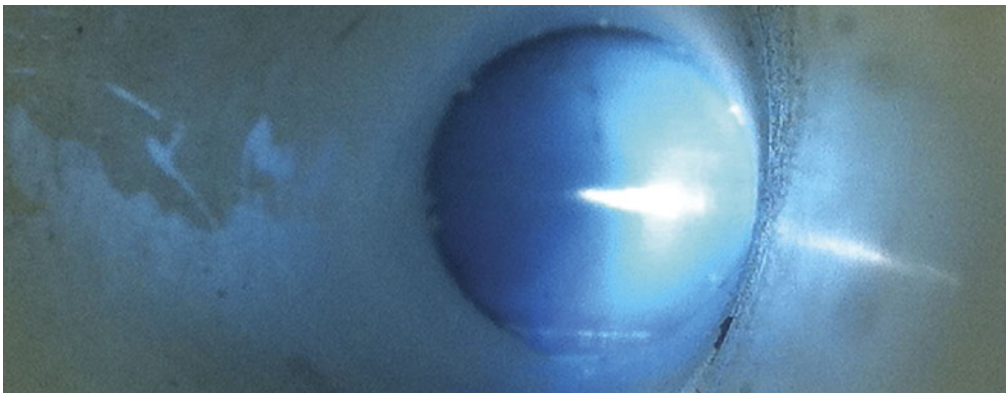
Nu Flow Ireland recently completed a successful sewage pipe retrofit project in Cork which the company said helped to avoid major disruption to five local properties, and yielded various environmental benefits too.

The project involved restoring pipes on a sewer line in Blackrock, Co Cork that were cracked in numerous locations and had deteriorating joints, which resulted in sewage entering the surrounding soil. The sewer suffered from frequent blockages, causing disruptions to homeowners.

Having researched various options, Murphy Coakley Consulting Engineers (MCCE) decided to tackle the problem by lining the existing sewer pipe with Nu Flow's Nu Flex process.

The works were principally undertaken from one property and involved the 'shutting down' of the main sewer for eight hours, with the agreement of homeowners.

The works changed the properties of the sewer lines from those of earthenware to PVC-like characteristics, according to Nu Flow. The company said this solution resulted in cost and time savings, and that other possible solutions would have required major disturbance.



Nu Flow said the works also offered environmental benefits: as well as stopping sewage from leaking into the ground and causing pollution, the NuFlow solution also saved the embodied energy and materials required for major groundworks.

"We looked at every possible solution to this problem, the Nu Flex process from Nu Flow was by far the best solution, both financially and for efficiency," said Nevil Coakley, a partner in MCCE.

(above) Nu Flow's retrofittable pipe lining system, Nu Flex

News

€3,000 worth of low carbon concrete up for grabs

Photo: Chris Bellew/Fennell Photography

Green cement supplier Ecocem are giving away €3,000 of low carbon durable concrete in a competition for residential construction projects.

Entry is free and is open to any project on the island of Ireland. The prize can be won by the client, engineer, architect or contractor working on the building.

Ecocem's low carbon concrete features ground granulated blastfurnace slag, which is produced from a byproduct of steel or iron production. This means its carbon footprint is much lower than traditional portland cement, which has its own dedicated manufacturing process.

The concrete will contain a minimum of 50% Ecocem GGBS cement. The closing date for entries is 25 February 2013.

To enter the competition, complete an entry form at lowcarbonconcrete.ie/competition. Full terms and conditions, and closing dates, are listed on the competition website. For any questions please contact David O'Flynn at doflynn@ecocem.ie

(above) Ecocem managing director Donal O'Riain

Ventilation specialists: passive shouldn't mandate heat recovery

Alternatives to heat recovery ventilation shouldn't be dismissed for passive house buildings in milder climates, ventilation specialists Aereco have said.

Speaking to Passive House Plus, Simon Jones, the French demand controlled ventilation specialists' Irish manager, explained that the benefits of recovering ventilation heat loss may fluctuate considerably in Europe's diverse climate zones.

"The need to recover heat loss through ventilation will differ greatly from southern Germany to southern Spain," he said. It's logical to suggest that there must be geographical areas where ventilation with heat recovery – while a good option – may not be the only technology that can deliver good indoor air quality and minimise heat loss to a point that is acceptable to the passive house standards.

"Demand controlled ventilation is one such technology, and one that has proven time and time again to do just that," he added.

Jones argues that "as with any product or brand", one of the biggest barriers to the passive house movement is the perceived complexity and cost. "One of demand controlled ventilation's greatest strengths – and perhaps why it has seen such positive traction in the social and affordable housing space – is its comparative simplicity and cost-effectiveness," he said. "It is also why 50% of our market is retrofit and renovation."

Jones says that flexibility on ventilation could play a key role in broadening the application of passive house and EnerPHit – the Passive House Institute's standard for energy upgrading existing buildings. "Is the end result or the means to the end result more important?" he asked.

According to Irish passive house certifier Tomás O'Leary of the Passive House Academy and MosArt, Jones may have a point.

"It's good every so often to look at climate specific requirements for passive house," O'Leary told Passive House Plus. "In milder climates like we have here in Ireland there may be alternatives to the 'classic' passive house specification that could achieve certification."

O'Leary points out that people often confuse standard practice in passive house to mandatory requirements. " Having heat recovery ventilation is not actually a certification requirement," he said, pointing out that the fundamentals of passive house certification include a 15 kWh/m^2/yr space heating demand, a tested airtightness of 0.6 ACH at 50 pascals, and a total calculated primary energy demand of less than 120 kWh/m^2/yr.

O'Leary explains that PHPP – the software developed by the Passive House Institute for designing passive houses – already includes an option for mechanical extract only, but warns against complacency.

"This shouldn't be regarded as a free-for-all away from heat recovery ventilation because the additional losses would have to be compensated in an even better envelope," he said.

(above) Aereco's BXC demand controlled extractor for mechanical extract ventilation increases or decreases ventilation rates depending on relative humidity levels

News

Smart Facades gets NSAI certification

Smart Facades has been certifed by the National Standards Authority of Ireland as a multi-storey contractor for external wall insulation. The company is a subsidiary of SF Plastering.

Speaking to Passive House Plus, the company's Stephen Fitzpatrick emphasised that quality workmanship is the most critical factor on any external insulation job.

“We have changed from just solely offering external insulation and now include in our services boiler and heating control upgrades, attic insulation, cavity wall insulation and demand controlled ventilation,” Fitzpatrick said. He added that since the company started offering a 'one-stop-shop' range of upgrade services, clients have been willing to spend more on a higher quality upgrade.

“On average our clients are spending about 30% more on a higher quality more energy efficient upgrade which in turn has a quicker payback period,” he said.

The company was also recently awarded the contract to install external insulation on a project to upgrade 21 apartments in Shannon, Co Clare.

Smart Facades is also now approved by Enprova, an organisation of certified retrofit contractors established by the Irish Petroleum Industry Association, who are required by government legislation to help their customers' reduce energy use through measures such as insulation and heating upgrades.

(above) Smart Facades work with a range of different external insulation systems, such as this retrofit in Howth, Co Dublin using 140mm Diffutherm wood fibre external insulation

Beam launches new low energy HRV range

Beam Vacuum & Ventilation has launched a new range of "extremely low energy consumption" advanced counterflow mechanical ventilation units with heat recovery (MVHR).

Beam's sales manager Paula Osborne said the units are designed to enhance a building’s energy efficiency rating. She said the new Axco C range of MVHR units feature the latest EC motors with specific fan power from 0.4 wls-1, and meets the Energy Saving Trust's best practice standards.

"In addition, a highly efficient heat exchange of up to 92% results in a best in class performance," Osbourne added.

"Another outstanding energy saving feature is the automatic demand control functionality, which responds to rise in humidity via an adjustable setting. With a setback option for unoccupied periods, the system delivers top performance when and where needed."

A fully adjustable boost overrun timer from 0 to 60 minutes can be set automatically or manually to suit a user's lifestyle.

“Another unique feature of the range is the specially designed temperature controlled summer bypass which incorporates a patented stainless steel shutter valve, assisting with comfort cooling in summertime,” Osborne said.

G4 Eco-filters are fitted as standard. Low cost filter refills are available, saving on waste and cost. "The compact design of each of the units allows for easy installation in a utility room or cupboard or where space is limited," she said.

(right) Beam Vacuum & Ventilation’s Axco C130 heat recovery ventilation system

News

Ground source heat pump delivers low cost warmth at children's hospice

A ground source heat pump and underfloor heating system, supplied by renewable heating specialists Unipipe, is delivering cutting edge and comfortable heating to the Laura Lynn House children's hospice in Leopardstown, Co Dublin for a fraction of the annual cost of fossil fuels.

Opened in September last year, the Laura Lynn House is Ireland's first children's hospice, and is part of the larger Sunshine Home for children with life limiting conditions.

Unipipe supplied a ground source heat pump and underfloor heating system to the home last year. A 40kW twin stage Nibe heat pump heats the 2,000 square metre centre via underfloor heating, assisted by a 50 square metre solar thermal array that contributes to both space heating and hot water demand. The set up is designed to deliver maximum comfort and control at low temperatures and low cost.

Unipipe's Paul O'Donnell said Nibe is increasingly putting emphasis on combined solar and heat pump systems. The Nibe unit draws on heat from four bore holes under the car park. The system was designed by Homan O'Brien engineers in conjunction with Unipipe, with the installation carried out by the McKeon Brothers.

The 40 kW heat pump has used a total of 19,696 kW hours of electricity since installation last September. On the basis that's divided equally between night and day rates at an average electricity cost of 13.5c per kilowatt, the total running cost since installation has been €2,658.

He said the energy produced for heating and hot water, excluding input from the solar thermal system, is 105,000 kW — meaning the cost of the equivalent amount of oil at today's prices of 10.73c per kW, burned at 80% efficiency, would have been €11,266.50 — more than four times the cost of running the heat pump.

(above) Laura Lynn House in Co Dublin features a 40 kW twin stage heat pump from Nibe

Magner advance with ultra low energy cavity wall builds

Cork-based contractor Magner Homes is currently on site with two ultra low energy cavity wall homes. While the majority of passive house dwellings in Ireland are built with timber frame or externally insulated concrete block, Magner's Ed O'Donoghue said it's now possible to offer passive-standard cavity wall construction.

He said the main benefit of cavity wall is that it's typically more cost-effective than other build systems.

"We've been kind of working around the low energy one off residential housing for a while," he said. "We'd always said there must be a really good a cost-effective way to deliver low energy performance in construction."

O'Donoghue read about Ancon's low thermal conductivity TeploTie wall ties in Passive House Plus's predecessor magazine, Construct Ireland, last year. TeploTie is certified by the British Board of Agrément for cavities up to 300mm wide, which allows for passive house levels of insulation in the cavity.

For Passive House Association of Ireland members Magner, it was the last piece in the jigsaw to offering a cost-effective, ultra low energy build. "All of a sudden we had our package," O'Donoghue said.

The company is also offering the 'sawtooth' foundation system developed by Seamus O'Loughlin of Viking House, which is designed to eliminate thermal bridging between the foundation and a cavity wall.

"This foundation system is so innovative," O'Donoghue said. "Now you can very easily get down to low wall U-values, and combine this with a passive foundation system."

Magner Homes has also introduced details to eliminate thermal bridging at wall plate level, and at gables.

The company is currently building two homes with super wide cavities — ˙one 250mm, and one 300mm. One will feature a Nilan Compact heat pump that combines ventilation and heating technology — another way to offer passive technology at lower prices, O'Donoghue said.

(below) an extra wide cavity built by Magner Homes using TeploTie low thermal conductivity wall ties

News

Dublin to get "energy smart" plaza

Photo: Paul Sharp/SHARPPIX

Sustainable energy adviser Codema and Dublin City Council have announced details of a design competition to develop an "energy-smart plaza" in the city centre. The competition is calling on designers, planners, ICT professionals, creative thinkers and visual communicators to develop "a one-of-a-kind concept to inform and inspire citizens about sustainable energy in a thought-provoking way".

The competition is part of the Ace project, which aims to promote renewable energy in northwest Europe.

Speaking before the launch, lord mayor of Dublin Naoise Ó Muirí said: "I am delighted that Dublin city is leading such an exciting project. This competition to design and install a smart energy feature in Dublin's city centre breaks new ground and offers a real opportunity to highlight the benefits of renewable energy to Dubliners and tourists alike in a creative, fun and interactive way."

Codema and Dublin City Council envisage that although the energy-smart plaza will be a physical installation, it will also be complemented by a virtual component which will "showcase how ICT and sustainability are merging to create an energy-smart city".

"This feature must highlight the smart link between renewable energy supply and demand but it must also grab the attention of passers-by," said Ace project manager Edel Giltenane. "The design competition is a blank canvas so we want entrants to be as imaginative as possible in communicating the smart feature, be it through art, technology, light or even sound. There are many people out there who don't know anything about renewable energy – these are the people we want to inspire."

Dublin City Council will invest €150,000 in the energy-smart plaza as part of the Ace project. In total, €1.5m will be invested in Dublin through Ace.

Minister for Communications, Energy and Natural Resources, Pat Rabbitte TD, who also attended the launch, said: "Ace is a prime example of how technology and renewable energy is converging to create a truly sustainable green economy. This project will adopt an innovative and forward-thinking approach towards renewable energy and, in turn, will help to realise our vision for a smarter way of living."

Visit www.aceforenergy.eu for updates on the design competition.

(right) Codema director Dr Gerry Wardell with energy minister Pat Rabbitte launching the Ace project at the Mansion House, Dublin

Hemclad helps to deliver "green" salad factory

Lime Technology has said that its pre-fabricated wall panel system Hemclad has helped Kanes Foods deliver "the highest standards of sustainability" at its new 10,000 square metre factory in Middle Littleton, England. To date, this is the largest factory anywhere in the UK to be built using the new Hemclad cassette walling system.

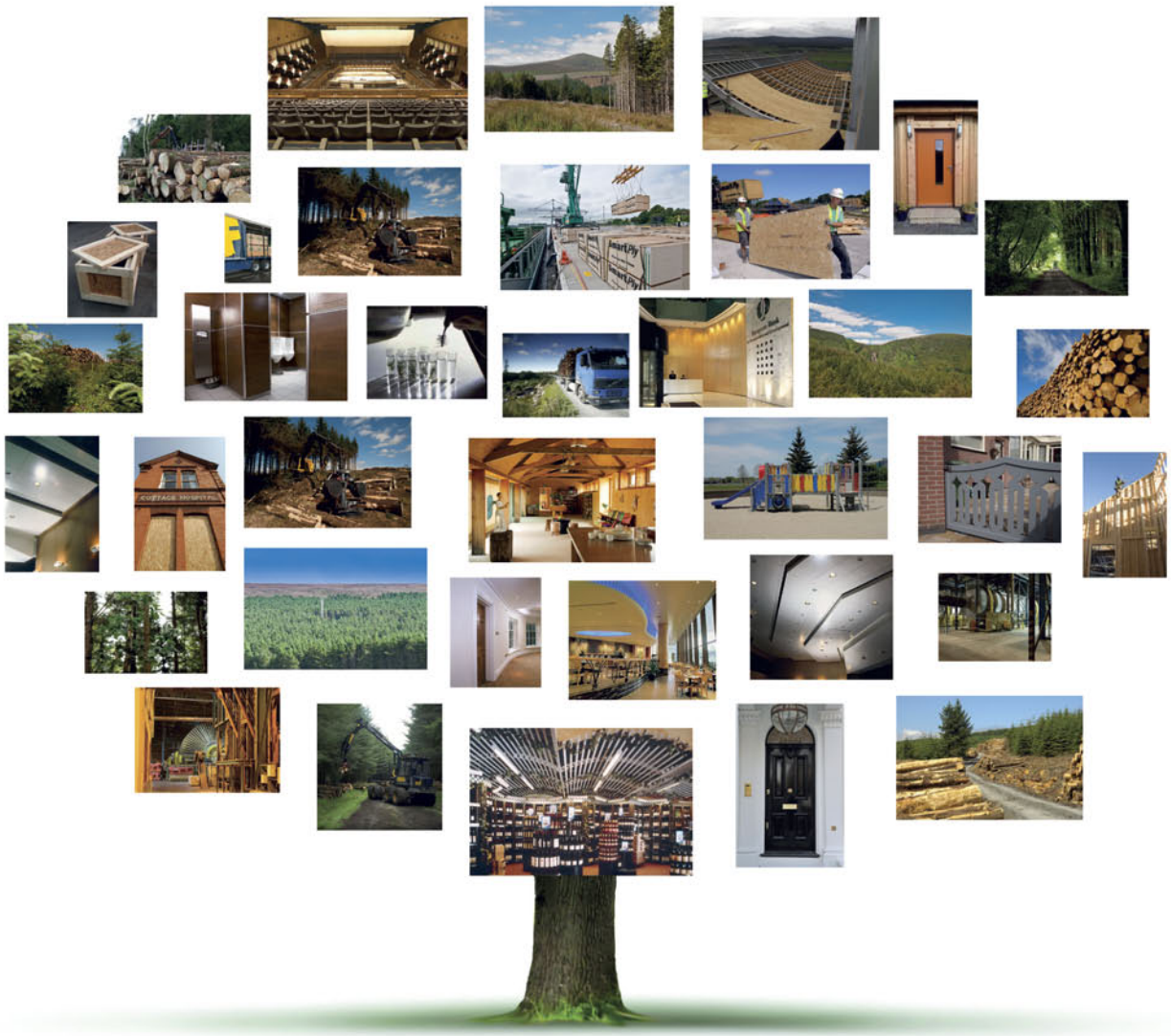
Lime Technology said the product offers high thermal inertia, low U-values and negative embodied carbon. The company also said that Hemclad can be erected "quickly and simply" on site.

The 3,500 sq m application onto the building's steel frame took approximately half the time expected – only 15 to 20 minutes for each individual Hemclad panel – helping the project to be delivered quickly, the company said.

The Hemclad system features bespoke timber cassettes which are manufactured in a controlled factory environment. They are filled with Tradical Hemcrete – a bio-composite insulating material made from a lime-based binder and hemp shiv – along with a hemp and flax fibre insulation to create a panel capable of achieving low U-values. The panels are then delivered to site and lifted into place.

Kanes Foods' new facility features solar panels, a geothermal heat pump system to assist temperature continuity, rainwater harvesting for use in amenity areas and a green roof that includes a range of indigenous wild flowers.

(below) the Hemclad prefabricated wall panel system was used to build the 10,000 sq m Kanes Foods factory in Middle Littleton, England



Cultivating creativity

Coillte Panel Products are part of Coillte, an innovative and sustainable Irish forestry and forest products company formed in 1989. All of our products come from our responsibly managed forests; we own over 442,000 hectares of land, about 7% of the land cover of Ireland!

Our FSC® (Forest Stewardship Council) certified panel products; Medite and SmartPly can offer you a real, sustainable choice. SmartPly produce Oriented Strand Board (OSB) a renewable, cost effective alternative to plywood and Medite manufacture a wide range of Medium Density Fibreboard (MDF) products, each highly developed and suited to a variety of applications.

Our commitment to new product development and process improvement has assured our market leading position and our timber products play a key role in building a carbon neutral future.

FSC
www.fsc.org

The mark of responsible forestry

FSC® C020700
FSC® C019958

www.medite-europe.com
www.smartply.com
www.meditetricoya.com

coillte panel products

medite SmartPly®

News

British 'green deal' must win consumer confidence, say Velux

Velux has warned that if the British government's 'green deal' fails to win the confidence of consumers it could be a "kick in the teeth" for the energy efficiency retrofit market. The green deal will allow homeowners to pay for energy upgrades via loans paid back through their energy bills.

Speaking as a panelist at the Liberal Democrat party conference last month alongside energy minster Ed Davey, Velux design manager Paul Hicks said it was imperative that energy efficiency measures reaped the rewards homeowners expected. He also called for assurances that the 'golden rule' – which requires that the cost of any energy efficiency measure must be equal to or less than the expected saving — is properly applied.

Hicks added: “It is important that the green deal considers how multiple energy efficiency measures will integrate and also how the maintenance of these measures will be paid for.”

Energy minister Ed Davey said the British government had moved to address some of these issues through training, accreditation and the creation of the green deal ombudsman: "Through the gradual roll-out of the scheme we can make sure we get it right and help to build confidence in the green deal," he said.

The panel, which also included MP Simon Wright and Glass and Glazing Federation deputy CEO Giles Wilson, agreed that the industry needed to be convinced of the benefits of becoming green deal accredited. Support from local authorities, and a push on take up of the scheme by entire streets rather than individual properties were discussed as ways of reassuring SMEs of demand.

All of the contributors agreed that the green deal will significantly benefit homeowners and businesses if applied correctly, but Davey acknowledged that government still needed to “dot the Is and cross the Ts.”

(below) Pictured (l-r) are Glass & Glazing Federation deputy CEO Giles Wilson; Simon Wright MP; Guardian head of environment Damian Carrington; energy & climate change minister Ed Davey; and Velux design manager Paul Hicks

Photo: Paul Heartfield

New version of passive house software available

The Passive House Institute has released a new version of its Passive House Planning Package (PHPP), the software used to design passive buildings, and check compliance with the standard.

The new version incorporates new requirements for the institute's EnerPHit retrofit standard, plus an improved user interface and new global requirements for passive house residential buildings.

The upgrade also includes more accurate window calculations, improved data input and dimensioning for ventilation systems, and the latest certified passive house components and international climate data sets. It also features a new metric to imperial conversion tool and import/export function.

The software is available for €160 plus shipping and handling for new users, or €130 for registered users. For more information visit http://tiny.cc/buyphpp

Think Safety. Think RGI.

By law only a Registered Gas Installer (RGI) is permitted to work on domestic gas installations.

A RGI is fully insured and trained in gas safety and will provide a Declaration of Conformance Certificate once the work is carried out.

***To find a Registered Gas Installer in your area, call* 1850 454 454 *or visit* www.rgii.ie**

REGISTERED
RGI™
GAS INSTALLER

Building? Upgrading?

Passive House Plus is here to help!

Are you designing, building or pricing a sustainable building? Whether it's an energy upgrade of a small house, or you're looking to achieve high green standards with a new home, office or factory, Passive House Plus can help.

Fill in your details below, or online at www.passivehouseplus.ie & your enquiry will be sent to the Passive House Plus advertisers that provide the products or services you need. If you fill out your postal address we'll even send you the next issue of Passive House Plus free of charge!

PLEASE POST TO TEMPLE MEDIA LTD., PO BOX 9688, BLACKROCK, CO. DUBLIN

name: _____

profession: _____

company: _____

address: _____

_____

phone: _____

email: _____

Site location (please list county): _____

Project type (tick box)

New home ☐ Home renovation/upgrade/extension ☐ New commercial/public building ☐
Upgrade/extension to a commercial/public building ☐

Other (please state): _____

Floor area (approx. ft² or m²): _____

Budget (approximate): _____

Stage (tick box)

Initial appraisal ☐ Pre planning ☐ Planning approved ☐ Pre tender ☐
Commencement notice ☐

Project imperatives (tick box)

Certified passive ☐ Near passive/low energy ☐ Indoor air quality ☐ Low running costs ☐
Low environmental impact ☐

Other (please state): _____

Estimated start date (please state): _____

Just tick the products/ services you would like more information on:

- Acoustic testing & consultancy ☐
- Airtightness testing & consultancy ☐
- Airtightness & draught-proofing products ☐
- Central vacuum systems ☐
- Cladding & renders ☐
- Demand-controlled ventilation ☐
- District heating ☐
- Eco flooring ☐
- Energy upgrade contractors ☐
- External insulation ☐
- Green building conferences, workshops & shows ☐
- Green cements & screeds ☐
- Heat pumps ☐
- Heat recovery ventilation ☐
- Heating controls ☐
- Insulated foundations ☐
- Insulation ☐
- Natural ventilation ☐
- Passive house & low energy build systems ☐
- Passive house consultants/designers ☐
- Passive house training courses ☐
- Rainwater harvesting ☐
- Solar photovoltaic ☐
- Solar thermal ☐
- Sustainably sourced timber & wood products ☐
- Sustainable building contractors ☐
- Thermal breaks ☐
- Thermal building blocks ☐
- Timber frame ☐
- Underfloor heating ☐
- Windows & doors ☐
- Wood fuel / biomass stoves & boilers ☐
- Wood panel products ☐

I would like my project to be considered for feature in Passive House Plus (tick box) ☐

Problem solved

If you want to build smart, you've got to think smart. To find better quality and better value, you've got to look beyond the obvious. That's why the smart money goes on SmartPly.

SmartPly doesn't delaminate and has no knotholes, core voids or other structural defects and is less expensive than plywood. It's bonded with exterior glue and is ideal for flooring, roofing, wall sheathings, site hoardings and lots of other general building uses.

For more information or a free product sample please visit **smartply.com** or call **01322 424900**.

FSC www.fsc.org
The mark of responsible forestry
FSC® C019958

CE
Bord Agrément na hÉireann
Irish Agrément Board
Certificate no. 02/0093

BBA BRITISH BOARD OF AGREMENT
CERTIFICATE No 98/3488/C

coillte panel products

SmartPly®
The Smart OSB Answer to Plywood

www.smartply.com

you tell us

letters/comments/emails/tweets

SEAI estimates on the running costs of heat pumps
I have inspected many properties where high running costs are incurred with heat pumps because (over and above the well-knowns of insulation, airtightness, etc) not even basic control items such as outside temperature monitoring are installed, let alone proper control systems requisite to efficiency!

It is vitally important that installers fully understand and integrate proper control systems to heat pumps if the 'estimated' benefits suggested by SEAI are to be achieved. Such understanding is crucial to reverse the public's anecdotal view that such systems are costly to run.

Mine has been saving me money for over 8 years now!
Fergus Merriman
Merriman Solutions

I recommend reading the Energy Saving Trust report on the actual measured performance of heat pumps. It paints quite a different picture to the SEAI theoretical figures.

Heat pumps have a great future in Ireland as the national grid de-carbonises, but let's give an accurate assessment of the likely seasonal performance of 'real' installations to the general public.
Chris Croly
BDP

Construct Ireland's change to Passive House Plus
I find this all a little disturbing. The SEAI See the Light conferences seemed to have morphed into the Passive House Association of Ireland's annual conference last year and as of this year it has become officially tied to passive house. I felt it was established to be a conference on how many solutions can come together to produce a better built environment. This is not a diatribe against passive house design or the Passive House Institute. Far from it – I think they have done and continue to do great work.

However there are people who neither like the all pervasive nature of passive house nor think it the solution to all ills. There are many ways of thinking about how to design low energy buildings. There are those who feel it's a waste of resources to demand that all houses are brought to the passive house standard – that our climate doesn't require such a high level of airtightness and insulation, that passive house was designed for a climate with much greater extremes of temperature than here in Ireland.

A magazine that was dedicated to a wide range of issues with regard to sustainability in construction seems to have aligned itself now to one side of the argument – pinned its colours to the masthead, as it were. Maybe I'm judging too harshly as I haven't seen the format yet, but the title's a bit of a giveaway. I realise the 'plus' gives you the flexibility to make it about more than just passive house but try telling the Democrats that a publication called Republicans Plus is for them.
Your healthy sceptic,
Cathal O'Boyle
Cathal O'Boyle Architects

Passive house designer vs passive house consultant
First let me clarify that I like passive house and I believe it's worthwhile building to this standard. Currently there is a two tier system that certified passive house consultants can call themselves. There are certified passive house designers and certified passive house consultants. The difference between the two lies in their professional background. Take this list of occupations for typical designers/consultants from the passivhausplaner.eu web site:

Passive house designer:
Architect
Civil engineer
Building physicist
HVAC engineer
Timber construction engineer
Master bricklayer
Building technician
Engineer for environmental protection in the building industry

Passive house consultant:
Chemist
Electrical engineer
Wood technician for window construction
Real estate agent
Environmental engineer
Energy consultant
Joiner

The problem is that some certified passive house designers are offering architectural services. The term "Architect" may be protected under Irish law, but instead some people are saying they are designers now and the certification only gives them more clout to design dwellings – after all they are certified passive house designers. That could be mistaken by some members of the public. After all, architects design houses.

Anyone who successfully completes the course has the right to use the term. This implies they're certified by the Passive House Institute to design houses, which I believe is wrong. They're certified to be consultants on projects that may be registered as certified passive houses.

Yes a passive house must be "designed" to passive house standards but to take an example from the list of passive house designers, a master bricklayer alone cannot design a passive house, with all due respect. I think it's misleading.

Being a certified passive house consultant is another good feather in anyone's cap and shouldn't be mistaken for qualifications to design houses.

All certified passive house designers should be called certified passive house consultants – it's a better term.
Zeno Winkens
Winkens Architecture

Write to us at:
letters@passivehouseplus.ie or Temple Media, PO Box 9688, Blackrock, Co Dublin, Ireland.

Your comments may be edited.

Follow us on Twitter & send us your tweets: @phplusmag

Best of luck with this transition! Your efforts for having Ireland better constructed are commendable.
@Barros_Isabel

Wishing you all the best with the rebranding and the new publication
@ISOQUICKUK

Best of luck with the new mag, sure Passive is only Massive at the moment
@bakerinsulation

Best wishes with the new publication. Our UK followers are in for a treat with the new publication!
@ecologicalbuild

Sorry to hear it's the last edition. I've enjoyed reading it.
@peterstafford

Best of luck with the rebranding and publication. CI was an excellent read, can't wait to read the all new Passive House Plus
@Eco_Evolution

Best of luck with rebranding, sounds good. Last issue of CI may be worth a bit in years to come?
@architectmark

Why the path to recovery will be passive

*MosArt & Passive House Academy co-founder **Tomás O'Leary** sees great prospects for Ireland's beleaguered construction sector – if we embrace the passive house approach*

July 2012 was the 4th anniversary of the demise of the architectural and construction industry in Ireland. I should know, because in the first few weeks of August 2008 the running joke in our office was "has someone cut the phone lines?" Four years later, and this is no laughing matter. To be perfectly honest, if we don't do something pretty radical pretty soon, it will be another four years or maybe more until we see a pickup of any note.

We face the choice to either sit on our hands and wait out the doldrums, or to take proactive action and set a new course which will kick start the sector once more.

It is my conviction that the best way forward is through marketing our goods and services abroad. All the indications are that it's going to be deadly quiet in Ireland for the next several years, so we need to look elsewhere for markets that need high quality products and know-how. We should promote Ireland on the world stage as a leading green construction nation, one that is focused entirely on delivering buildings of the highest quality. The effort should be marketed under a brand that is recognised globally as the ultimate in terms of energy efficiency. What I'm referring to here is passive house.

At the national See the Light Conference in September at Citywest, we heard from a City of Brussels official on how they have decided to mandate the passive house standard in 2015. All new construction from that year on has to be built to the passive house standard. The significance of Brussels following this path should not be underestimated. It is, after all, the political capital of Europe, where a lot of far-reaching policy decisions are made. Other cities and regions will no doubt follow, and soon enough there will be nation states signing up because they see the sheer common sense of it.

It is my hope that Ireland rises up to this challenge and becomes the first state in the world to adopt the passive house standard. We have a track record of being first out of the traps with such policies as the smoking ban and plastic bag levy – so why not sign up for something that will generate significant employment and innovation?

To adopt the passive house standard as an acceptable means of complying with the Building Regulations would put Ireland on the global stage in terms of green construction. Speaking English and given our international reputation as the land of 100,000 welcomes won't do us any harm either. We now have a fine stock of demonstration passive house buildings to showcase, including schools, offices, nursing homes, social housing, a supermarket, student residence and lots more besides. Plus, we have quite possibly the largest manufacturer of passive house windows in the world in Munster Joinery.

But perhaps more significantly than all this, we have a highly educated design and build community emerging. Ireland is just second in the world to Germany in terms of the number of certified passive house consultants and we are also leading the way in terms of certified passive house tradespeople.

Given the worldwide support structure provided by Enterprise Ireland, I see no reason why designers, consultants and contractors can't reach out and offer their services internationally. Munster Joinery is doing this already, serving the massive US market through Klearwall.com – incredibly, there is no company in the US yet making certified passive house windows. The Passive House Academy too is consulting internationally, certifying passive house projects not just in the US, but also in far flung places such as China and New Zealand. The academy is also providing training in the US to architects and consultants and could therefore act as a conduit for other companies wishing to break into this market.

If Ireland goes passive, it will drive innovation, research and development and exports in a sector that is clinging on for dear life. I can envisage a time when teams of highly skilled craftsmen will be travelling internationally to work on ground-breaking projects – much like the Germans and Austrians do currently.

We have a great opportunity to be first out of the blocks. It's not about the building regulations, and it's not about saving the planet right now – it's about developing a deep green brand for Ireland.

Let's not be the second man on the moon.

(right) the city of Brussels has mandated the passive house standard for all new buildings by 2015

Photo: John and Melanie Kotsopoulos

Is a large remote passive house a sustainable building?

Building to passive levels doesn't give people the right to ignore other green concerns, argues Irish Green Building Council director ***Pat Barry****, writing in a personal capacity*

It's hard to avoid noticing that many of the passive houses in Ireland are of a size that would make Saddam Hussein – in his finest palace-building prime – blush. Many also appear to sit resplendent in double car dependant rural isolation, sterilising hectares of prime agricultural land. Don't get me wrong – passive house has been a great development in Ireland, and every designer should use it as a tool to assist in the design of low energy houses. But if we want to create genuinely sustainable and economic homes, we need to ensure that we are consistent with the intent of passive houses – saving money, energy and the environment.

"Lets stop codding ourselves. Unless we get these basics right, we're not going to see the benefits of the passive house revolution."

Ireland's carbon profile is unusual, and very different from the rest of Europe, as it's more skewed towards transport emissions than energy used by buildings. Between 1990 and 2007 emissions from the building sector rose slightly. In the same period emissions from transport rocketed, growing by 181% to become the highest consumer of primary energy, taking up 43% of the total. This isn't surprising. One-off housing makes up 64% of the state's housing stock. An extraordinary 60% of workers commute to work by car.

We need to ensure that an obsessive silo focus on heat energy consumed per square metre does not obscure the intent of reducing the actual overall energy and carbon footprint per household. After all, a passive house that is three times bigger than it needs to be is a 45kWh house. Add in the additional embodied energy and carbon for the unnecessary area and we are heading back to where we started in 2002. Heard of the rebound effect?

The Carbon Trust estimates the embodied carbon of building a new two-bed cottage at 80 tonnes, so imagine the embodied carbon of some of our behemoths. Unfortunately like Deap – SEAI's software for calculating Building Energy Ratings – the passive house software standard can be more easily achieved in larger houses because of the surface to volume ratio. Try it on a 80 to 90 sq m family house and you will struggle – as I have recently – without very thick walls.

A first strategy should be to reduce size. Investing in a good architect will provide the best return on investment. They should be able to extract the same sense of space and dramatic effect, in a design specifically for your lifestyle and site, in half the area as an inappropriate standard plan bought off the internet. It still astonishes me that some self builders spend more time talking about heat pumps than design.

For the isolated rural site, transport becomes as much a part of the essential equipment as the heat recovery system, and we must consider its impact both on cost and carbon. What's passive about a house that's dependant on two massive pieces of costly kit which need replacement every 10 to 15 years? Each car will have an embodied manufacturing carbon footprint of between six tonnes (Citroen C1) and 42 tonnes (Land Rover) expended every time they're replaced. Whilst a saving of €1,200 a year on heat energy is not to be sniffed at, it pales when compared to the annual cost of running the two cars – €11,837 per small family car band C, according to the AA. Indeed in well planned settlements cars will increasingly become a luxury rather than a necessity. Across Europe, people are choosing to access them through car share schemes and peer to peer sharing to avoid the massive costs of ownership.

If we compare the option of building a new, two car dependent, isolated 350 sq m passive house – with one daily 10km each way commute – versus a car free, 2002 era 130 sq m house with a 100 kilowatt hour space heating demand built close to amenities and public transport, there's simply no contest. If we factor in the annualised embodied carbon over a 100 year life cycle of the two houses, the embodied carbon of manufacturing the cars and the daily travel, the smaller connected house wins by a country mile. All the benefits of passive house are wiped out by bad location, and the household could have twice the carbon footprint of the inefficient house, using eight times as much heat energy.

We also need to consider the ongoing loss of bioproductive land in Ireland. We lost 745 square kilometres to agricultural production between 1990 and 2006. We have more than enough partially developed or brownfield sites in and around our hamlets, villages and towns to meet our needs and we need to concentrate development here. Food Harvest 2020 seeks to increase agricultural productivity in Ireland. Taking land out of production is going to impede this and hit all our pockets.

For starters, let's at least apply three golden rules to complement passive house development in Ireland.

1. Keep houses to reasonable size – let's say no greater than 150 sq m in floor area. A bit of time on design and refining the brief always helps here.

2. Let's think twice before building on sites carved from agricultural use.

3. No more fully car dependent houses. All houses should be within existing or well planned settlements with public transport and/or public services schools, shops, etc. This will save real money.

Lets stop codding ourselves. Unless we get these basics right, we're not going to see the benefits of the passive house revolution.

MEDITE FR (Flame Retardant)

MEDITE EXTERIOR

MEDITE ECOLOGIQUE (Zero added formaldehyde)

MEDITE FQ (Flooring Quality)

MEDITE TRICOYA (NEW Extreme Durable MDF) 50 year guarantee

MEDITE ULTRALITE

MEDITE PREMIER (All purpose)

MEDITE MR (Moisture Resistant)

We're continually evolving

Find your most extensive range of MDF from Medite. With over 35 years' experience in MDF, our research and development brings you a range that's extensive, innovative and sustainable.

For more information or a free product sample please visit **medite-europe.com** or call **01322 424900**.

Medite: Raising the standard of MDF

FSC www.fsc.org

The mark of responsible forestry

FSC® C020700

coillte panel products

medite

International selection

What do certified passive houses in Germany & France, community centres in Austria and the USA and the 2011 Solar Decathlon winner have in common? Architect and Passive House Association of Ireland chair **Martin Murray** finds inspiration in each of the five ground breaking buildings

The emergence of Passive House Plus like a chrysalis from the old shell of Construct Ireland is a further step along the way in the extraordinary contribution Ireland has made to the development of this international low energy standard over the past ten years.

Low energy design has been a slow burner across the construction industry both here and abroad over the past ten years. There's no doubt that Construct Ireland played a key role in maintaining it at the centre of debate and pushing for continuous improvement of energy performance – not just in the buildings themselves, but also by the practitioners, on both sides of the drawing board.

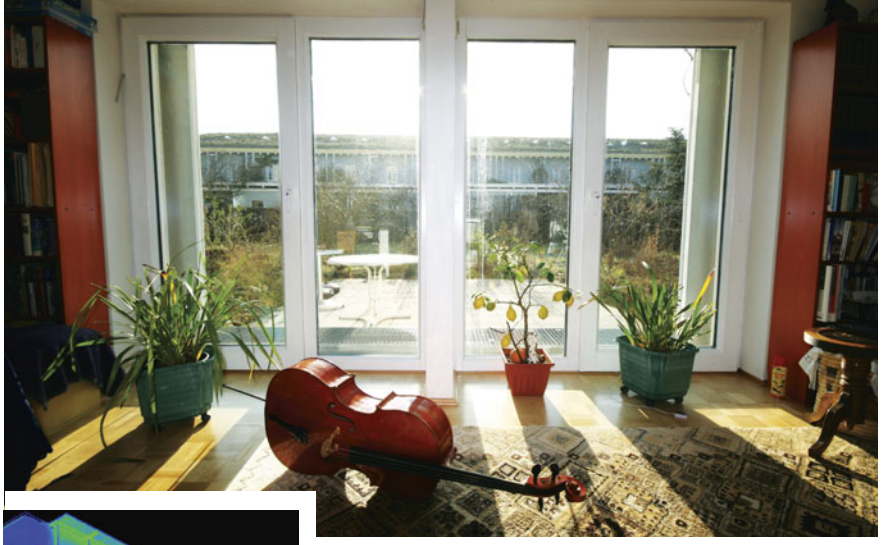
Buildings designed to the standard of passivhaus – or passive house – are exemplary low energy sustainable buildings with greatly reduced CO_2 emissions and very high comfort and environmental standards. They require a sophisticated combination of good orientation, a highly insulated fabric, low air permeability, minimal thermal bridging, excellent triple-glazed window components and efficient heat recovery ventilation. The combination of these disparate elements through the PHPP (Passive House Planning Package) software gives rise to robust, efficient low energy designs. And Ireland has an ideal climate for their realisation.

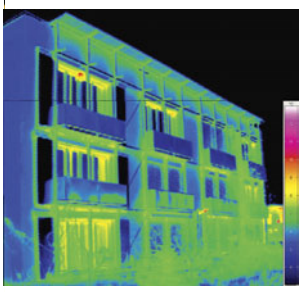
A recent potted history of the evolution of these sustainable buildings forms the basis for my selection. The buildings extend back to the beginning of the passive house standard through to sophisticated iterations at both a commercial and domestic scale, and unto two final projects which begin to capture a wider environmental agenda.

They seem to me to reflect not the overt visually attractive structures favoured by architectural magazines worldwide. Rather they are of a different compelling beauty, a different ilk. To quote the visionary engineer Buckminster Fuller (1895 -1983):
"When I'm working on a problem, I never think about beauty. I think only how to solve the problem. But when I have finished, if the solution is not beautiful, I know it is wrong."

So with these sentiments in mind, please enjoy some very beautiful sustainable buildings.

Photos: The Passive House Institute/HG Esch





tural, social or technical shifts in ways that are visually striking; the works of, say, Le Corbusier, Mies, Erskine, and Piano & Rodgers are exemplary in this respect. This passive house is more reticent, it contains all of the characteristics which have evolved since 1991, toward becoming the principles of passive house design, and it is, in this respect, iconic and beautiful.

The low energy characteristics include compact design and good orientation giving measured solar benefits, an enclosing fabric with a high level of thermal performance, minimal thermal bridging, triple-glazed windows and heat recovery ventilation. All combined, the net result is a very low heating usage of 9.2 kilowatt hours per square metre per year. The project has underpinned a significant amount of active monitoring across 20 years since its construction. It has been exemplary in proving passive house principles, and has led to the development of products and mechanical systems appropriate for passive house construction. The level of airtightness achieved was amazing: 0.22 air changes per hour at 50 pascals of pressure. Further testing ten years later showed no reduction in this value.

It's important to emphasise that the house was designed to be both a comfortable home and a test-bed laboratory of sorts, and so at the beginning the cost benefits relating to all the key component design decisions were analysed. This gave rise to the understanding that all household energy use within the home had to be understood to avoid fall back toward inefficient means of substitute heating even within the highly insulated fabric. In total, eight different research projects fed into the knowledge which made the building possible. At the time in 1991, the research costs and special construction costs amounted to an increase of almost 50% over baseline building costs. These were grant assisted. Today in Ireland the additional cost of building to passive house design is as low as 5 to 8% depending on the detail of the project.

This iconic building was finished in October 1991 and has been continuously in use and continuously monitored ever since. It gave rise to the development from 1996 of preliminary versions of the PHPP software. Since then the comforts of the passive house – warmth throughout with exceptionally good air quality – have been available to all who choose to pursue them, and at a reasonable price. PHPP has subsequently founded a basic scientific approach to the design of many types of passive house buildings – one such being the community centre in Vorarlberg. ▶

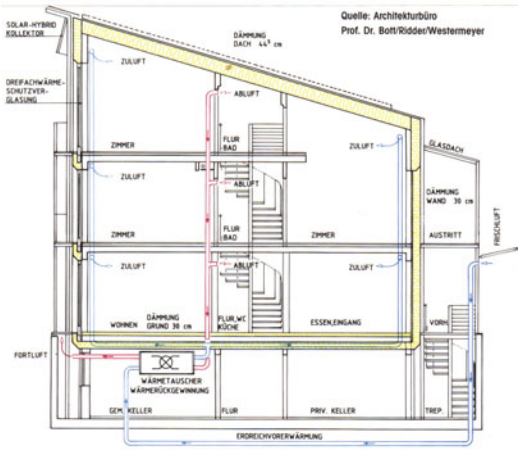
Passive house, Darmstadt

It is perhaps always presumptuous to suggest that something is ever truly the first of anything. There are cultural and technical paradigm shifts that build up to a point in time when what is produced becomes noted as the 'first' embodiment of an ideal.

So it is with one of the first passive houses built in 1990/91 to design plans created by Profs Bott, Ridder and Westermeyer for four private clients – one of whom happened to be the physicist Prof Wolfgang Feist, who went on to become a founder of the Passive House Institute. The construction of this multi-unit development is based on research work which evolved throughout the 1980s in Europe – particularly Sweden and Denmark – Canada and America as the realisation of the need for low energy buildings became paramount. Three of the main protagonists in this regard were architectural professors Bo Adamson and Robert Hastings along with the aforementioned Wolfgang Feist.

The completed building is three storeys over basement with living spaces orientated toward the south, with a north facing facade containing a single-glazed entry area allowing covered access to the basement storey.

Some iconic buildings bear testimony to cul-



Photos: Bruno Klomfar Photography

Ludesch Community Centre, Vorarlberg

A well designed and briefed community centre has great potential to draw together a neighbourhood, creating an evocative and iconic image within the minds of its users. Built by the 3,300 citizens of Ludesch, the passive house community centre within the province of Vorarlberg is just such a building.

The germ of the building initially evolved through a broader low energy programme launched in 1998, the e5-Programme for Energy Efficient Communities. Its intention was to support municipalities in their efforts to raise energy efficiency, and increase the utilisation of renewable energy sources. Thirty-four communities and one region joined the e5 programme, and for the municipal area of Ludesch the design and construction of the community centre was the natural development of the overall initiative.

As with most successful projects the initial briefing was carefully considered, with over six years of planning going into the making of the building, which was eventually completed in 2005:

The building had to achieve low utility costs and an optimal ratio between total costs and the lifespan of the building constructed to the passive house standard and built in adherence to ecological guidelines. It was important that biomass energy be used for heating and lumber from the silver fir tree in the surrounding forests for construction of the building, walls and furniture.

Designed by Architekten Hermann Kaufmann, the building is 3,135 sq m in area, or 14,500 cubic metres in volume. The ground floor contains a multi-purpose hall, town library, mail room, coffee shop, rooms for a children's play group and two businesses. Upstairs there are municipal offices, an information centre for midwives and some additional offices for private service providers.

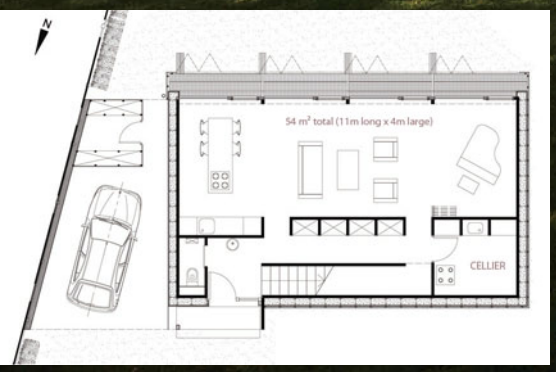
The key architectural feature of the building is the U shaped entrance courtyard which is roofed with inclined glazed elements containing 350 sq m of solar photovoltaic (PV) cells. The creation of this village square as the communicative middle point of the village was one of the key recommendations of the original study groups. The PV array generates 16,000 kilowatt hours (kWh) of electricity per annum – enough to allow for selling of the surplus into the national grid. Thanks to the e5 programme the overall municipality of Ludesch has a high percentage of PV systems for energy supply – the village has one square metre of PV surface area per inhabitant.

While the entire internal area of the new community centre is equivalent to 22 one-family homes, the building's energy requirements don't even exceed the energy needs of two homes. The building, which was awarded the Energy Globe Vorarlberg, is optimally insulated and fitted with heat recovery systems. The architects relied on local and renewable raw materials such as wood, and excluded any building materials containing CFCs or PVC. Sheep's wool, for example, was even used to insulate the windows. For this reason also, PVC was also avoided in the ductwork, electric cable casings and floor coverings. The use of solvent containing materials like lacquer, paint or glues was also frowned upon, as well as the use of softeners and substances containing formaldehyde. Cellulose and sheep's wool was used extensively for the insulation in the walls, whereby it was accepted that sheep's wool was capable of absorbing poisonous vapours to a certain degree. The final additional costs of this consistent ecological construction method were only 1.8 %.

The deciding factor for the appearance of the centre was the use of timber. The consequential use of the rough hewn, untreated wood of the silver fir on the building's facade is responsible for the appearance of the three structures. The direction of the planks creates diverse block diagrams and calls forth magical light and shadow effects on the building. The silver grey patina that is formed by weathering will lend the building an additional vibrancy in years to come. The one metre wide overhangs aid the constructive protection of the wood. Inside, the untreated silver fir wood creates a warm atmosphere, and gives the spaces a friendly open character. Because of this, the community centre has a vibrancy and presence which is unusual for an administrative building. It sets high standards for the entire process of implementing community building projects everywhere. ►

(above) timber takes centre stage at the Ludesch Community Centre; (opposite, top) the entrance courtyard is a key feature of the building, and is roofed with 350sq m of solar PV cells which generate enough electricity that the excess can be sold into the national grid

Photos (p30-32): Herve Abbadie / Karawitz Architecture



Private house, Île-de-France

More so than the commercial and community passive house projects, the design theme of the free standing private home has been an iconic image in the evolution of the passive house design idiom. Designed by Karawitz Architecture, this single family home on its own plot in the Bessancourt suburb of Paris is a particularly elegant example of this progression.

The house overall has the ideal passive house plan formation with circulation – or servant spaces – across the north facing rear of the block while all living areas – or served spaces – at ground level, and bedrooms at first floor level, achieve a southern aspect.

Consisting of cross laminated columns 600mm deep at 900mm centre to centre, the timber framing module creates a defining but open spatial structure. In this spirit, passive house is perhaps the true technical heir to the original modernism endeavour of open plan flowing design – notwithstanding the truer realities and challenges of noisy and messy children, and spatial privacies!

The shape of the house follows the generic domestic shape of old farmhouses in this area of northeast Paris. Its modernity is expressed in a stripped down simplicity of form which is overlain with a folding bamboo screen to give summer shading and visual privacy during the day. Hopefully the residents discovered the lack of privacy which such gives at night before it was too late! This screen is perhaps without technical merit on the north elevation, covering as it does solid wall, however it evokes again the traditional farm barns in this part of France and will allow a rich patina of age to develop over the years as it goes grey. The architects accept that the bamboo will require replacement over the years.

The only concrete element in the construction is the concrete slab, while the roof mounted ▶

(clockwise from above) glazing in the Bessancourt passive house is limited on the north face; but extensive to the south; the timber structure coming together onsite; the bamboo screens can open fully to increase passive solar gains; the bamboo forms an ecological brise soleil; airtightness testing; a dividing wall provides adaptable spaces; (p31 main photo) the bamboo screens closed to provide summer shading; (inset) a plan showing south facing living space and north facing circulation areas; the bamboo panels (p30) of this vaulted timber building evoke the traditional farm barns in the area

solar PV array gives 2,695 kWh of electricity per annum. Overall the 161 sq m house uses only 4,300 kWh of energy per annum, reflecting the Factor 10 principle which pervades most passive houses – the house uses 90% less energy for heating than a typical house in the area.

The rest of the timber framed structure was prefabricated off site with U-values of 0.14 for the outer walls, 0.12 for the roof and 0.17 for the 200mm insulated concrete slab. As one of the first certified passive houses in the Paris area it undoubtedly reflects accurately the elegance and demeanour of the region as a whole.

Photos: Courtesy of Pringle Creek

Painters Hall Community Centre, Oregon

The creation of beautiful, sustainable, low energy buildings is the hallmark of the Living Building Challenge (LBC), an environmental design paradigm which has evolved through the Cascadia Region Green Building Council and the International Living Future Institute, both based in Oregon, USA.

One of the first buildings certified under this rigorous design methodology is Painters Hall, a community centre originally built in the 1930s. Located on a 32 acre mixed use site in Salem, Oregon, the upgraded building has achieved zero energy status, the LEED platinum standard and LBC 'Petal' recognition.

The reference to petal recognition evolves from the structural format of the LBC energy primer, which utilises a flower as a metaphor for truly sustainable buildings – self-contained and reflective of the carrying capacity of their site. The LBC allocates markings across a range of 'petals' including site usage, water, energy, health, materials, equity and beauty – overall a challenging heptagon of sorts. In the case of Painters Hall, energy, equity and beauty were the targeted recognitions.

The building's original name evolved from the previous use of the site as a training centre. The intention is to retain its educational links by becoming a meeting and low energy educational centre to reflect the aspirations of the Pringle Creek community as a whole.

The centre uses approximately 20,000kWh of energy per year, but produces 26,000kWh from its roof mounted PV array. A communal geothermal heat pump serves the primary heating needs of the facility. For water conservation, low flush and dual flush fittings combined with grey water harvesting contribute to an annual saving in water usage of 12,000 gallons.

Practitioners and contractors should note that during the renovations almost 90% of material waste was diverted from landfill, while a quarter of the materials (by cost) used in the building resulted from active recycling. Additionally all paints, adhesives, and composite wood products used on the project were designated as being low VOC (volatile organic compounds).

A number of environmental imperatives arise from the LBC petals which had to be considered in the design process of the project. The energy petal gave rise to the net zero energy imperative which was focused on the mantra that a kilowatt hour saved on site was less expensive than one produced on site. To this end the walls, floor and roof were upgraded to a high thermal performance using blown cellulose, finished in light internal colours to reduce electrical lighting loads. These strategies were combined with careful selection of light fittings, occupancy detectors, and dimming overrides. At a cost of $300 worth of hardware, a building energy management system, TED, measures total building energy consumption, photovoltaic energy production and individual circuit loads. This device and its software can communicate with web-based programs so that owners can access an energy dashboard via the internet at any time, sharing data with others and receiving weekly summaries by e-mail that compare usage trends.

As is the hallmark of all the buildings in this selection, the attention to detail is paramount. It renders the question poised by the Living Building Challenge: What if every single act of design and construction made the world a better place? It's a rhetorical question, because in the case of this building they do. ▶

2011 Solar Decathlon Winner, University of Maryland

Photos: Jim Tetro Architectural Photography

It is within the university of life that many of us hone our skills, buffeted and knocked by the challenges of the everyday. A different educational experience is to be had through hardcore university research in the form of the projects presented in the bi-annual Solar Decathlon. A low energy building competition for competing universities and technical institutes, the decathlon undoubtedly acts as a portal into what sustainable design will be like in future practice.

WaterShed – the University of Maryland's winning entry into the Solar Decathlon 2011 – is a solar-powered home that comprises systems which interact with each other and the environment to satisfy the competition brief. Just as Painters Hall placed the consideration of water reuse centre stage, water was a central theme of this project.

The house was to be designed, built and operated to be cost-effective, energy efficient, and attractive. WaterShed carried this energy emphasis through to the next great environmental challenge, water, whereby the project attempts to harvest, recycle and reuse every drop of water which lands on its site.

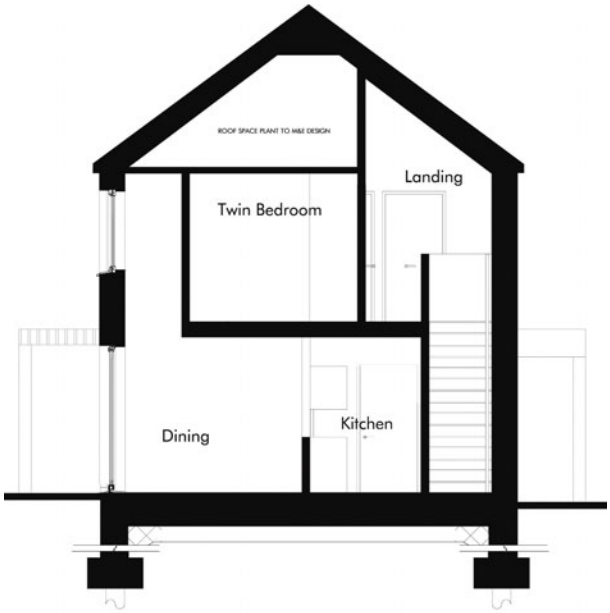
The panel of judges assess the competing entries across ten criteria: their architectural qualities, market appeal, engineering, educational/communication effort, affordability, "comfort zone," hot water systems, appliances, home entertainment and energy balance. The resulting complexity creates valuable interaction between students, faculty and professional mentors.

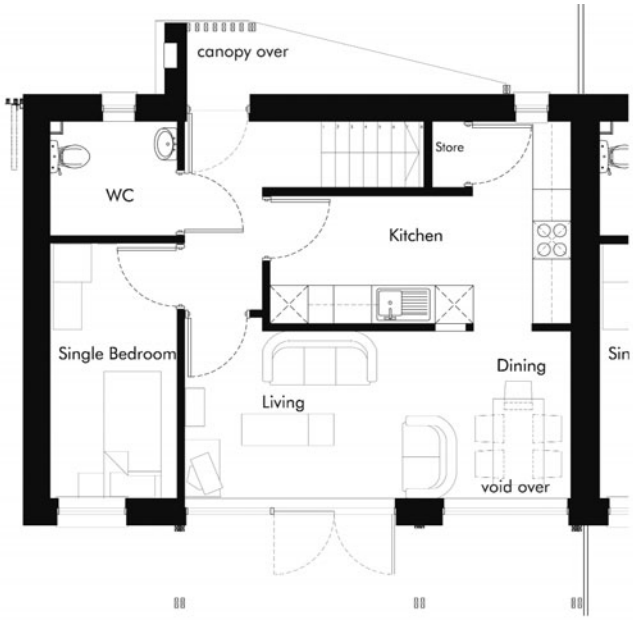
The interdisciplinary team on WaterShed evolved a design which includes a host of innovations. A split-butterfly roof captures and uses both sunlight and rainwater. Constructed wetlands filter storm-water and grey-water. A green roof attenuates rainwater and promotes efficient cooling. A photovoltaic array harvests enough solar energy to power WaterShed all year round. A solar thermal array fulfills all domestic hot water needs. A garden of 'edible landscapes' supports community-based agriculture. A patent-pending indoor, liquid desiccant waterfall provides high-efficiency humidity control. And the building itself is an efficient, cost-effective, structural system.

As a competition for third level students, the decathlon is evocative and demanding. In 2007 Spain agreed to organize the first European decathlon and in 2013 the first such event will be held in China. Without doubt the research and effort which goes into each and every design is a loud echo of the work and analysis that gave rise 20 years ago to the Darmstadt passive house.

It's worth noting that this respect for research, monitoring and analysis, is at last gaining traction within the built environment courses throughout Ireland. Have no doubt that the chrysalis like emergence of Passive House Plus will facilitate further these endeavours. As the proverb goes, "Just when the caterpillar thought the world was over, it became a butterfly."

WaterShed is comprised of three interior spaces - a living and kitchen area (above), an office and bedroom area (far right), and a bathroom module (right) connecting the two. The bathroom is the focal point of the design and water conservation and reuse is a central theme to the project. The sloping roofs (opposite, top) maximise solar energy generation and collect rainwater to use around the house





Dungannon social housing sets passive example

A new five house terrace in Dungannon, Co Tyrone can make a proud boast: it's the first certified passive social housing development on the island of Ireland

Words: Lenny Antonelli

Social housing may have finally come of age. Three years ago Dublin City Council & Séan Harrington Architects built the pioneering low energy York Street social housing complex in Dublin City Centre, and now the island of Ireland can boast its first certified passive social housing development.

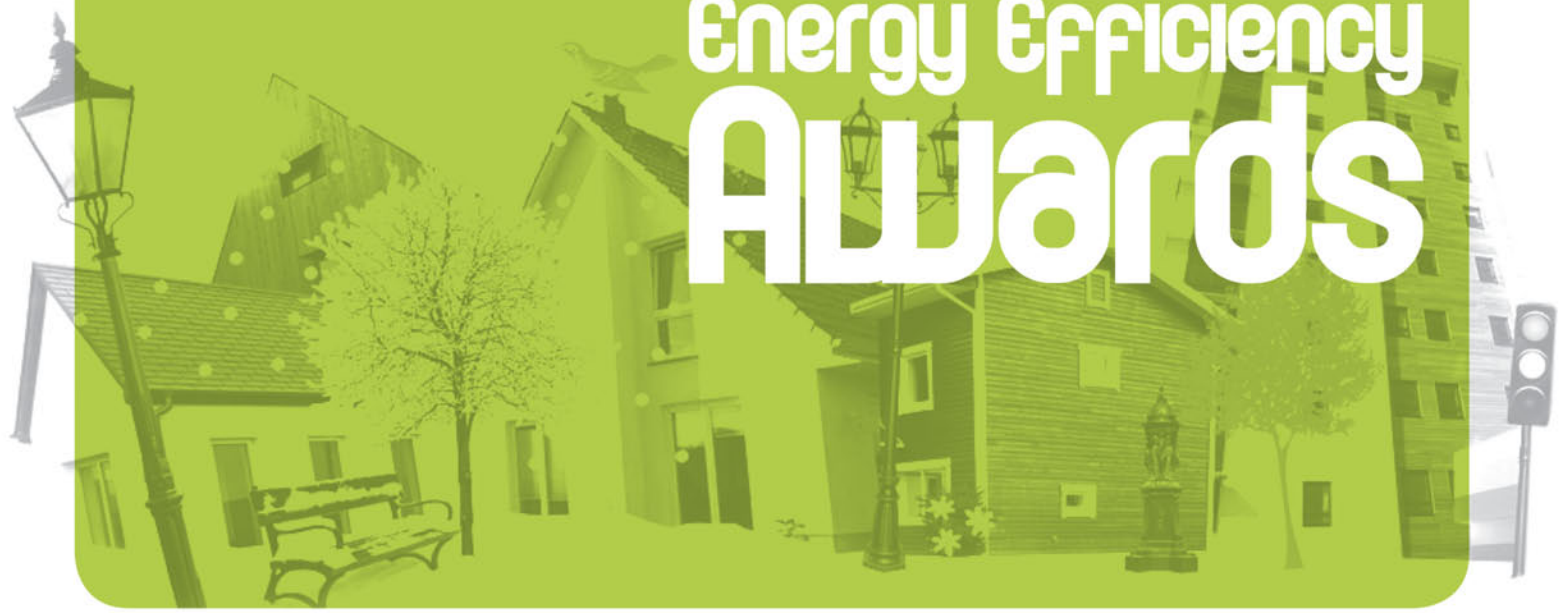
Lisnahull Terrace in Dungannon, Co Tyrone is a five house development with a dead simple approach to slashing energy consumption: insulate the building envelope well, make it airtight, and install a small, simple heating system. But the passive house standard isn't just about cutting energy use, it's about delivering warm, comfort-►

Photos: Jonathan Hay

Deadline for Entries EXTENDED to 1st November!

Call for entries

The 2013 ISOVER Energy Efficiency Awards



ISOVER ENERGY EFFICIENCY
The Best of Awards 2013

ISOVER SAINT-GOBAIN

Irish prize fund €5000

The best European energy efficient renovation & construction projects. For entry forms and information kit, please visit **www.isover-eea.com**. Full competition terms and conditions available on our website.

able homes with good indoor air quality too.

Long stigmatised as cramped, cold and damp, new social housing in Ireland has come a long way. Ireland and the UK suffer some of the worst rates of energy poverty in western Europe. But we seem to finally acknowledge and understand the challenge, even though much of our old social housing stock still requires a major upgrade. But University of Ulster fuel poverty expert Christine Liddell said the issue had finally "come of age" at the charity Energy Action's annual conference last year, and there's now more focus on the quality of new social housing than ever before.

Two years ago, the Northern Ireland Housing Executive announced plans for a passive social housing development, and sought a housing association to oversee the project. Oaklee Homes Group was appointed, with passive house experts MosArt brought on board as consultants.

Oaklee previously built some of the first homes in Northern Ireland to hit level four on the Code for Sustainable Homes, a UK code that measures how green a building is across categories like energy, water, materials, waste, pollution and ecology. One is the lowest score on the scale, six the highest. Oaklee's four star development in Carnlough, Co Antrim is built with hemp and lime, and features cellulose and sheep's wool insulation too.

At Dungannon, architects Kennedy FitzGerald again had to hit level four on the code, and meet the ultra low energy targets set by the Passive House Institute.

Naturally, the passive house standard heavily informed the design of the terrace, overseen by senior architect Jonathan Hay. This meant toilets, circulation spaces and small windows were kept to the north of the building, with living spaces and lots of glazing to the south.

But Lisnahull Terrace doesn't look like social housing, and its clean and contemporary design can help consign pebble dash council estates to the dustbin of architecture.

Coleraine-based Benbrook Timber Frame built the shell of the houses. The walls feature 190mm of rigid Xtratherm PIR (polyisocyanurate) insulation, and a Pro clima vapour control membrane serving as the airtightness layer. The roof has an almost identical spec, while the ground floor is insulated with 200mm of Springvale's Floorshield platinum EPS insulation.

Cork-based manufacturer Munster Joinery supplied the house's triple-glazed, Passive House Institute certified PVC windows.

"There was a steep learning curve to the project," says Brian Rankin, energy officer at Oaklee Homes. Hitting the passive house airtightness standard was the biggest challenge, he says, with main contractor T&A Kernoghan responsible for achieving it.

While the passive house airtightness standard is typically referred to as 0.6 air changes per hour – using a blower door which measures how much air must be blown in and out of the building to maintain a pressure differential of 50 pascals – designers are allowed to round down, so in practice any score under 0.649 meets the standard. In the end, all five houses got over the line.

The design at Lisnahull Terrace also paid close attention to thermal bridging — the loss of heat through uninsulated points in the building envelope, such as at window sills. To eliminate this, contractor T&A Kernoghan used Foamglas Perinsul cellular glass insulation blocks at weak points such as along the external perimeter at floor-to-wall junctions, and at load bearing walls and door thresholds. A layer of rigid PIR insulation on the room side of the timber frame structure is continuous through the external walls and roof, which also cuts out thermal bridges.

Heating experts Caldwell Consulting designed the heating systems at the terrace. Naturally the space heating needs of passive homes are low, so the biggest draw on heat is for hot water. Oaklee also wanted a heating system that would be simple for tenants to control.

So each house got an array of solar vacuum tubes, plus a liquified petroleum gas (LPG) boiler, both of which feed each house's 280 litre thermal store. Caldwell chose LPG as the fuel as there's no natural gas network in the area. Calor Gas maintain a central tank of the fuel on site, topping it up whenever it's running low and billing each house based on its own consumption.

The boiler only kicks in if the solar panels can't heat the thermal store sufficiently and the tank is kept constantly warm, so hot water is available instantly.

"The idea was to capture as much energy as we could, store it and then release the energy when required," says Caldwell Consulting's Alan Geddis. "The whole idea is that you only use as minimal an amount of energy as you ▶

The front of Lisnahull Terrace faces north and keeps glazing to a minimum; with large south facing windows and doors to the rear; (p41, top) Foamglas Perinsul blocks were placed along the external perimeter and load bearing walls to help eliminate thermal bridging; (bottom) the timber frame panels being lifted into place

Building ?

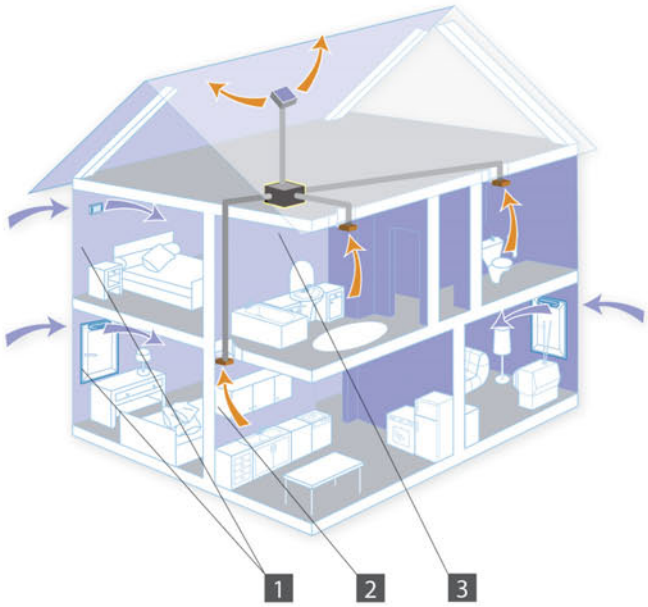
Make the smart investment in your future home, investigate...

Demand Controlled Ventilation

Demand Controlled Ventilation is a way ventilating the home that adjusts the amount of air brought in and taken out, based on the actual need (Indoor Air Quality).

Key points

- Provides **excellent** indoor air quality
- Energy **efficient**
- Little to **no maintenance**
- **No** filter change
- **Simple** to install
- **Limits** the build-up of humidity and condensation which can cause mould and health problems
- Cost **effective alternative** to heat recovery
- A superior product to the outdated and ineffective hole in the wall and noisy bathroom fan



3 component parts to a DCV system

1 Air inlets
Supply fresh air to rooms like bedrooms and living rooms.

2 Extract grilles
Take air away from wet rooms like bathrooms and kitchens.

3 Fan
At a central point that exhausts out of the building.

Aereco Ltd, Unit 703, Euro Business Park, Little Island, Cork
tel.: 021 429 60 30 - aereco@aereco.ie - www.aereco.ie

aereco

ADV525GB_v0

possibly can."

The thermal store can provide space heating in two ways — by heating incoming air in the heat recovery ventilation system, or by heating the three small radiators in each house. Residents can control both heating sources separately, and the system is set up so that if the temperature in the house drops, both will come on, then the radiators will switch off when temperatures inside reach the desired temperature, with the air heater shutting off shortly after.

A coil in the thermal store also heats mains water flowing through the cylinder for washing and bathing.

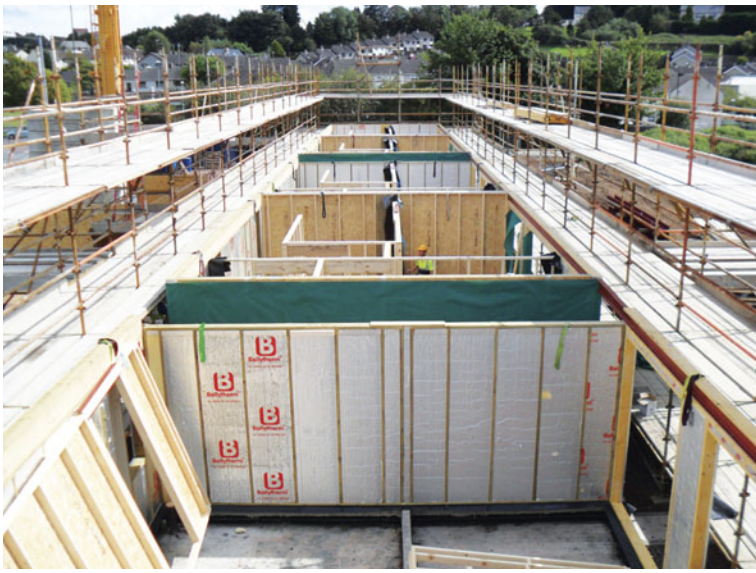
A Paul Focus 200 heat recovery ventilation system, certified by the Passive House Institute, extracts stale air from 'wet' rooms such as kitchens and bathrooms, using a heat exchanger to pre-heat fresh incoming air.

Oaklee will closely monitor two of the houses over the next two years, studying their energy and water use, indoor temperatures, CO_2 and humidity levels.

All five houses are certified by the Passive House Institute, so it might seem odd that their Energy Performance Certificates – the UK equivalent of Ireland's Building Energy Ratings – only come in at a C rating. Alan Geddis says the Standard Assessment Procedure software, which is used to calculate EPCs, "is very sore on the use of LPG as a fuel". Whereas BERs work out a building's energy rating based on kilowatt hours of primary energy usage alone, the UK system produce a rating based on energy efficiency and fuel costs.

Leaving aside the option of renewable heating, Geddis says the rating would have been better if either natural gas or oil were chosen. But he says LPG was a better option for the development than oil or gas because its carbon emissions are lower, it can better modulate to match the heat load of the homes, and it's easier to store on the development's small footprint.

Oaklee put a lot of work into educating the terrace's tenants on how the houses work too — crucial for ensuring they perform as designed. ▶



- ✓ Quality-led
- ✓ Reliable
- ✓ Experienced in ultra low energy buildings

From foundation to rafter, we have what you're after*...

At Smart Facades we can help make your sustainable building a reality, as our track record on highly energy efficient, green buildings shows. Whether it's the OLS Architects energy upgrade in Wexford designed to EnerPHit standards, or a Joseph Little Architects-designed deep retrofit with wood fibre external insulation in Howth, we've made our name delivering excellence in ultra low energy building.

Smart Facades is a subsidiary of SF Plastering Ltd, a specialist plastering contractor with more than 12 years experience in residential, commercial and industrial projects throughout Ireland. We are recognised for high quality, both in workmanship and service. Our continued commitment to innovation and improvement ensures that our clients receive the best advice and service possible. All of our work is unique and tailored to your requirements. You benefit from economies generated by our experience in materials sourcing and work scheduling, while optimum standards are always maintained. We have grown to be trusted, recommended and referred throughout Ireland.

***OUR EXTENSIVE RANGE OF PRODUCTS & SERVICES INCLUDES:**

Ventilation | External Insulation | Solar Panels | Heating Controls | Boiler Upgrades

Turnpike Lane, Ballymount, Dublin 22
Lo Call: 1890 91 11 91
Telephone: 01-545 6819
Email: sales@smartfacades.ie
www.smartfacades.ie

SF Plastering
Machine Plastering Specialists

NSAI Agrément
ETICS Approved Contractor
Parlso Mince
SF Plastering Ltd.
REG No. IAB/0113

ENPROVA
IRELAND'S ENERGY CIRCLE

Smart Facades
External Insulation Specialists

Oaklee prepared information packs detailing how the building's energy systems work, then followed up with home visits.

The association is now planning a new development that meets level five on the code, which Brian Rankin says is "likely to be the first of its kind in Northern Ireland".

And green features at Dungannon go beyond just energy: the development also boasts features such as rainwater harvesting, bicycle storage and permeable paving (which helps to drain water away naturally and prevent flooding), all of which helped it get its four star Code for Sustainable Homes rating.

But this project isn't about bells and whistles — the strategy was to heavily insulate the building envelope and make it airtight, hit the passive house standard, and design a small heating system that's simple to control. A simple, smart design philosophy.

SELECTED PROJECT DETAILS
Clients: Oaklee Homes Group
Architects: Kennedy FitzGerald Architect LLP
Contractor: T&A Kernoghan
Quantity surveyors: VB Evans
Civil / structural engineer: McAuley & Browne
Services consultants: Caldwell Consulting
Passive house consultancy & certification: MosArt Ltd
Construction, design & management consultants: Campagna
Airtightness tester: Airtightness Ireland
Timber frame: Benbrook Timber Frame
Windows & doors: Baskil / Munster Joinery
Airtightness products: Siga/Glidevale
Insulation: Ballytherm/Xtratherm/Springvale
Thermal breaks: Foamglas Perinsul blocks supplied by Thermal Insulation Distributors Ltd
Solar thermal: Kingspan Renewables
Heat recovery ventilation: Paul Focus
Rainwater harvesting: Kingspan Environmental ▶

PROJECT OVERVIEW:

Building type: 495 sq m terrace of five, two-storey timber-frame three and four bedroom social houses.

Location: Lisnahull Terrance, Dungannon, Co. Tyrone

Completion date: April 2012

Budget: £642,700 total

Passive house certification: all five units certified

Space heating demand (PHPP): the five houses range from 9 to 14 kWh/m²/yr

Heat load (PHPP): approximately 10 W/m²

Airtightness: ranging from 0.619 – 0.645 ACH at 50 Pa

Energy Performance Certificate (UK)
Energy Efficiency Ratings(EERs): all houses achieved C ratings with scores of 80 (a score of 81 would have upped them to a B rating)
Environmental impact (CO2) Rating: all houses scored 89, a high B rating. (An A rating requires 91 or more). Their estimated CO_2 emissions range from 1.16 to 1.25t/yr

Dwelling Emissions Rating (required for NI Part F compliance): ranging from 13.34 to 13.76 (calculated in Sap)

Primary energy use ranges from 65 to 67kWh/m²/yr (calculated in Sap)

Thermal bridging: Foamglas Perinsul blocks used along the external perimeter at the floor to wall junctions and at load bearing wall, with additional Perinsul blocks used at door thresholds. A 50 to 60mm layer of continuous rigid insulation on the inside of the timber frame studs runs around the entire external walls and roof construction. An additional 40mm service cavity filled with insulation around windows, door reveals and roof to wall junctions for added insulation. Split timber studs with insulation between used at window heads and cills. Special detail used at internal wall to external wall junctions to ensure airtightness and minimised cold bridging. Linear thermal bridging calculations were carried out for all details.

Ground floor: Piles required due to poor ground conditions with strip concrete foundations. 150mm concrete slab, DPM & airtightness membrane, 200mm Springvale Platinum Floorshield insulation (0.03W/mK), 100mm sand cement screed. U-Value: 0.143W/m²K

Walls: 100mm rendered blockwork, 50mm ventilated cavity, breather membrane, factory-built timber frame with 9mms Smartply OSB board all joints taped and sealed, 140mm timber studs at 600 centres with 140mm PIR insulation tightly fitted between studs, Siga airtightness tapes & protect BarriAir membranes, 50 to 60mm PIR continuous insulation held with 50x40mm timber battens creating a service cavity filled with insulation where required around window reveals etc and 12.5mm taped and jointed plasterboard. U-value: 0.125W/m²K

Roof: plain concrete roof tiles on battens on breather roofing membrane on 50mm counter battens creating ventilated air gap, followed underneath by 9mm OSB board, all joints taped and sealed, 140mm timber studs at 600 centres with 140mm PIR insulation tightly fitted between studs, Protect BarriAir airtightness / vapour control layer with Siga airtightness tapes, 50 to 60mm PIR continuous insulation held with 50x40mm timber battens. Service void and plasterboard only to underside of roof where exposed and not in roof storage space. U-value: 0.133W/m²K

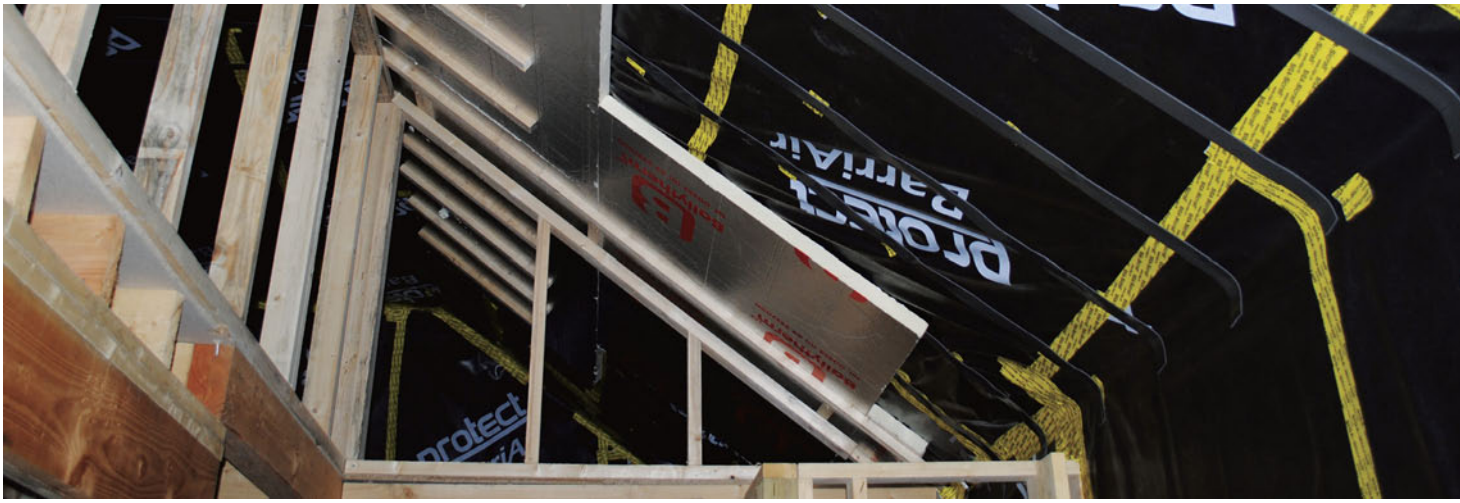
Windows: Passive House Institute certified Munster Joinery PassiV Future Proof triple-glazed windows, with argon filling, thermally broken frames and an overall U-value of 0.8 W/m²K.

Heating system: Vaillant Ecotec Plus 618 LPG boiler feeding radiators, with heating support by heat recovery ventilation. Each house has 2.79 m² Thermomax evacuated tube solar arrays, and 280 litre thermal store with instantaneous DHW coil and solar coil

Ventilation: Paul Focus 200 heat recovery ventilation systems — Passive House Institute certified

Additional green credentials: FSC certified materials including timber studs & Smartply OSB. All timber furniture is from PEFC certified sources. The houses include rainwater harvesting, rain water butts, and recycling provision, and have achieved level four in the Code for Sustainable homes

(top) a blower door test being carried out; (middle) Siga airtightness tapes were used around window frames and wall/floor junctions, and (bottom) a Protect BarriAir airtightness membrane was fitted in the roof



Kilkenny passive self-build, inspired by us

Photos: bNEW Photography

Having pored over the details of low energy buildings featured in Construct Ireland – the former name for this magazine – self-builder Kevin Collins set about realising a home that combines art deco inspired design with the energy performance specs of a passive house

Words: John Hearne

Kevin Collins and Margaret Duggan's new home on the outskirts of Kilkenny achieves startling results for a self-build. A highly insulated building envelope together with excellent airtightness works with a combination of renewable technologies to deliver a comfortable environment at recession busting prices.

And unlike most self-builders, Collins says he thoroughly enjoyed the process. "I loved it," he says. "The approach I had was that this has got to be fun, this has got to be a great learning experience. If it's highly stressful, there's something wrong."

He'd wanted to build his own home for years, and had over time arrived at a clear design concept. But when it came to figuring out exactly how the house would be built, he found himself at a bit of a loss.

"So I started to research the whole area, and one of the most helpful sources of information I found was Construct Ireland, in particular those sections at the end of each profile which shows who did what on the build," he says.

One of the central problems with low energy building, he points out, is that the only ready source of information is salesmen. Working through the 'selected project details' section at the end of each article in Construct Ireland, Collins started calling up companies and tradespeople to get a sense of what they knew.

"I kept plugging away and asking questions," he says. "If someone came across as knowledgeable, I would have a second and third and fourth question ready, and if they didn't stumble, I knew they knew their stuff."

He also spent a lot of time visiting houses featured in the magazine, or else ones referenced by contractors and suppliers. "I'd see an article about how it was built, I'd read the comments from who built it, and when I went to visit them, I'd always ask 'If you were doing it again, what would you do differently?' That was a very powerful question."

Collins lengthy selection process led him eventually to Cork-based Construct Ireland stalwarts ECO Homes, who went on to provide the factory built timber frame, complete with cellulose insulation and airtightness measures. "When we went to ECO Homes, they were very precise," says Collins. "There was one way of doing it and it was their way. They were more concerned – and this is what I really liked about them – with how we were going to upskill all the other guys coming to site. That gave me a lot of confidence." He says too that ECO Homes refused to begin constructing the frame in the factory until the foundation was in place. "They needed to be sure that their measurements were absolutely precise. Because these two processes didn't run in parallel, that probably added six weeks additional time to the project, but I don't blame them at all for taking that approach."

The ECO Homes closed-panel system delivers a passive-standard building envelope. In addition to ticking all the right energy saving boxes, Donal Spillane of the company explains that aesthetics were also a priority. "There were quite a few design features such as a cantilevered stairs, glass balustrades, curved walls and a curved balcony. We also installed concealed downpipes within the exterior cladding, which gives a clean and contemporary look. All of this required close co-ordination between us and the nominated sub-contractors."

This is a big house – 3,500 square feet – with a well dispersed footprint. Size matters in terms of sustainability. Larger buildings mean more building materials, although the use of low embodied energy materials in the home's timber structure, cellulose recycled newspaper insulation, Fermacell and blockwork-displacing Aquapanel cladding lessen the impact to an extent.

"Yes it is large, and we're going to pay the price down the road with property tax, no doubt," says Collins, who points out that the house scores ▶

(above and p47) as well as having the energy performance specs of a passive house, the building includes design features such as glass balustrades, curved walls and a curved balcony; (opposite, bottom) large triple-glazed windows allow plenty of natural light into the house

better than many self builds in transport terms. The centre of Kilkenny city is a 15 minute walk away, and the garage is wired for an electric car.

Size is also a factor in terms of heating demand. Passive principles generally favour a more compact design and layout in order to make the space easier to heat efficiently. The design nonetheless manages to achieve a space heating demand which comes in at the passive threshold of 15 kWh/m^2/yr.

Aside from a heat recovery ventilation system, the building's small heating demand is met by a 16 kilowatt heat pump feeding underfloor heating on both floors. "We only need the heat pump on at night," says Collins. "We would probably manage with a ten kilowatt heat pump, and we put underfloor heating upstairs even though we thought it might be overkill," he says. "We didn't want to be guinea pigs". Collins says the room-sealed fire in the living room has been turned on just twice since the couple moved in.

Collins chose Kilkenny-based heating specialists MD Energy to install the heating and hot water system – which also includes a solar thermal array – as well as a rainwater harvesting system. "Working on a passive house was a new experience for us," says MD Energy's Martin Donnelly. "But because Kevin researched this so well, it made it so much easier. He knew what he wanted."

Airtightness was achieved through a combination of proprietary airtightness tapes and OSB. Process is of course as important as product in achieving the right results here. Alan Spillane of Greenbuildstore.ie, who carried out the airtightness tests, says that Kevin Collins' management of all the tradespeople onsite was vital in that regard. "He was sat on top of everybody, making sure every cable they poked through the membrane was taped up." ▶

With our extensive experience, you can rest assured that when it comes to Passive House Standards, Kingspan have you covered.

Whatever your plan
You **can** with Kingspan.

www.kingspaninsulation.ie
Tel. +353 (0) 42 979 5000

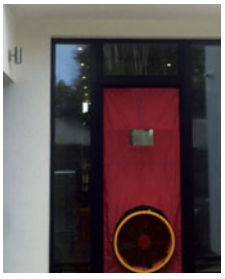
Kingspan®
Insulation

“Yes it is large, and we’re going to pay the price with property tax”

Collins explains his approach: “We had meetings to say, ‘look guys, if you knock a hole in the wall, that’s not a problem. The problem is getting it taped up correctly afterwards.’”

“Planning was a challenge,” says architect Martin Mulligan. “The planners were aghast at the initial presentation because it was a very contemporary building, and that was accentuated by the fact that the building on the left was a traditional bungalow.” The planners were eventually persuaded, though achieving some of the more challenging design features did require careful detailing on the part of ECO Homes.

Once the project team was assembled, Collins got everyone together to discuss the build and to make sure everyone approached it with the same mindset. “It’s all about research,” he says. “Research, planning, talking to people and getting the right attitude on board.”



SELECTED PROJECT DETAILS:
Clients: Kevin Collins & Margaret Duggan
Architects: Martin Mulligan & Associates
Main contractor & timber frame: ECO Homes
Quantity surveyors: Gillian Tyrell
Civil / structural engineer: D. Brennan & Associates
Airtightness products & testing: Greenbuildstore.ie
Windows & doors: Bonner Windows
Solar, heat pump, heat recovery ventilation & rainwater harvesting installation: MD Energy
Aquapanel cladding: Greenspan, installed by ECO Homes
Rainwater harvesting: Kenny Precast
Lighting design & electrics: Goodwin Electrical, Kilkenny
General contractor: John McMahon
Kitchen: Des Kearney Designs
Stairs & glass work: Signature Stairs
Canopy and gates: Ned Coady ▶

ECO Homes

DESIGNER
CERTIFIED PASSIVE HOUSE DESIGNER

www.ecohomes.ie

@ecohomesie

TURNKEY PASSIVE HOMES

MD energy

Call us now on:
056 771 2222

Renewable Energy Solutions

Energy efficient homes begin with MD Energy, leading suppliers and installers of renewable energy solutions including:

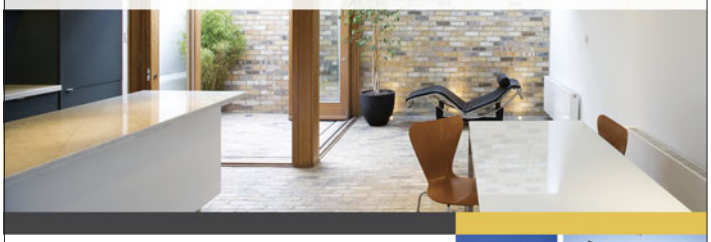
- Solar evacuated tubes
- Solar flat plate panels
- Geothermal heat pumps - vertical
- Horizontal collectors - bore hole system
- Air to water heat pump
- Underfloor heating
- Heat recovery ventilation systems
- Wireless zone heating controls: controlled with your pc or any smart phone
- Rainwater harvesting

Make your home an energy efficient home!

MD Energy are the official suppliers of:
Kingspan SOLAR · KingspanWater · CareyGlass SOLAR · Danfoss · Dimplex · GRANT · sei · Greener Homes Scheme

Contact us: MD Energy, Dean St, Kilkenny
t: 056 771 2222 | e: info@mdenergy.ie
www.mdenergy.ie

Creedon Construction



Eco & passive building

A long established and trusted company, we have vast experience in passive and low energy new build and upgrade projects.

Creedon Construction isn't limited to any particular construction method - we can build your passive house using the construction method of your choice.

Professional services

- Comprehensive pre-construction services
- Detailed construction management
- Accurate budget/estimating
- On-time scheduling
- Value analysis
- Design build

Winners of the OPUS Architecture & Construction Awards 2006
Highly Commended by OPUS Architecture & Construction Awards 2010

Creedon Construction Ltd., 11 Oldtown Drive, Sallins Rd, Naas, Co Kildare
t: 087 917 3672 | m: 087 966 6749 | e: michael@creedonconstruction.ie
www.creedonconstruction.ie

(above) the curved balcony overlooking the garden provides a quiet place to relax; (below) the cantilevered stairs; (p51, inset, clockwise from left) a blower door test clocked the passive house standard of 0.6 ACH; OSB and proprietary tapes serve as the airtight layer; the timber structure hoisted into place; the building's Supergrund foundations

PROJECT OVERVIEW:

Building type: 3,500 sq ft detached timber frame house

Location: Kilkenny

Completion date: December 2011

Budget: undisclosed

Passive house certification: not certified

Space heating demand (PHPP): 15kWh/m²/yr

Heat load (PHPP): 11 W/m²

Airtightness: n50: 0.60 ACH q50 = 0.88m³/hr/m²

Energy performance coefficient (EPC): 0.343

Carbon performance coefficient (CPC): 0.348

Provisional Building Energy Rating (BER): A2 (47.44 kWh/m²/yr)

Thermal bridging: Supergrund foundation with 200mm wide ring beam, giving a thermal bridge free floor perimeter. Service cavity battens run horizontally with 50mm Rockwool Flexi insulation installed in between, breaking the slight thermal bridge of the studs. Windows set back behind wood fibre board of walls in line with cellulose insulation.

Ground floor: Supergrund foundation with 300mm of EPS insulation. U-value: 0.10W/m²K

Walls: ECO Homes timber frame wall with Aquapanel cladding on a battened ventilated cavity, breather membrane, 22mm woodfibre board, 235 x 38mm cellulose-filled timber stud, 15mm taped and sealed 15mm Egger OSB 4, 50mm service cavity insulated with Rockwool insulation, and 15mm Fermacell board internally. U-value: 0.14 W/m²K

Roof: Natural slates externally on 50x35 battens and counter battens, followed underneath by breathable roofing underlay, trussed roof with 400mm of cellulose insulation at ceiling level with cross battens and plasterboard ceiling. U-value: 0.10 W/m²K

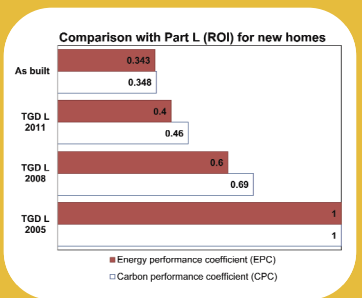
Windows: timber alu-clad windows with argon filled triple glazing. Overall U-value: 0.83W/m²K

Heating system: Dimplex 16kW air to water heat pump and Dimplex solar thermal collector with a 100L buffer tank. Room sealed Wanders fire, with external air intake.

Ventilation: Dimplex Xpelair Xcell 400 QV heat recovery ventilation unit. Up to 90% efficient based on Sap Appendix Q listing

Water: rainwater harvesting system for flushing toilets and gardening

Green materials: timber frame with cellulose insulation, wood fibre board, Fermacell, natural slate, Aquapanel cement fibre board to displace embodied CO_2 of blockwork



Wicklow and Meath passive schools make the grade

Earlier this year teachers and pupils at a primary schools in Moynalty, Co Meath and Enniskerry, Co Wicklow moved into their new school buildings. But these are no ordinary schools — they're the first in Ireland built to the passive house standard

Words: Lenny Antonelli

Scoil Mhuire National School in Moynalty, Co Meath and Powerscourt National School, Co Wicklow are set to become the first two certified passive schools in Ireland.

The schools are part of the Department of Education and Skills' energy research programme, which began in 1997. The programme will typically test a green technology or low energy strategy in a few schools, evaluate its performance, then roll it out in all new schools if it's proven to work.

Earlier this year our predecessor magazine Construct Ireland profiled Coláiste Choilm, an A2 rated secondary school in Tullamore that broke new ground for energy efficiency in Irish education (issue 11, volume five). The new building scored the best airtightness rating of any Irish secondary school and has a huge 120 square metre solar photovoltaic array, plus a long list of other green features.

Now the department's planning and building unit has gone a step further. In 2009, it decided to build two schools to the rigorous passive house low energy building standard. Rather than start with a blank canvas, it picked two primary schools already planned under its rural low energy schools programme.

Both schools were already going to feature passive solar design, wood pellet heating, natural ventilation, and lots of insulation. But the department wanted to push them further – to meet the world's leading low energy building standard.

Teaching tool

With a personal interest in architecture Denise Ward, principal at Scoil Mhuire, was excited by the prospect. The school had been housed in a 1938 building that she said was "very damp and very miserable."

"I was familiar with passive house alright," she says. "It's where we should be going. We should have all these green features in schools."

Apart from energy savings and comfort there's an added bonus to having a passive school, she says — it makes a great teaching tool. An interactive touch screen in each school's entrance hall lets pupils check the temperature and carbon dioxide levels inside, and to see what the various energy systems are up to at any time.

"That has been something that made the building real for [the pupils]. They like to see and touch the screen, to see the carbon dioxide levels, to see the temperature. It's more engaging for the children," she says.

Denise held on to bits and pieces of insulation and other construction materials from the job to use as teaching tools. The pupils were also given a tour of the site during construction, and they were given key jobs too, like turning the sod, and laying the first block.

"There's an awful lot to learn from it," she says. "It's teaching responsible living and awareness of the environment, and an awareness of our impact on the environment."

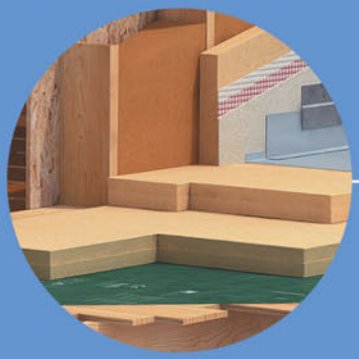
The design team for both Scoil Mhuire and Powerscourt included the department's own architectural team — project architect Niall Lowther, Pat Kelly, and Kevin Kennedy — and engineers, Axis Engineering for heating and electrical services, and civil engineers ORS Consulting.

Both schools are almost identical in their design and use of materials. Each has four classrooms, and is designed to make expansion to six or eight classrooms as simple as possible.

Passive design

Passive solar design principles were applied to both schools to the make the most of the sun's free heat. The classrooms benefit from ▶

Gutex vapour permeable wood fibreboards and **pro clima** Intelligent airtight and windtight products from Ecological Building Systems offers a complete high performance insulation and airtight system for low energy and passive house construction.



Gutex vapour permeable wood fibreboards offering one of the best thermal and acoustic insulation boards available

pro clima Intelligent airtight membranes, tapes and seals to create a complete, durable and effective airtight seal

ecological

BUILDING SYSTEMS LTD

Tel. 046 9432104
E. info@ecologicalbuildingsystems.com
www.ecologicalbuildingsystems.com

Setting the highest standards for

Low Energy and Passive House Construction

GUTEX®

NATURALLY MADE FROM WOOD

- Superior protection against the cold in winter and the heat in summer
- Outstanding acoustic performance
- Vapour permeable (μ of only 3)
- Used either internally or externally
- Roof, wall and floor applications

pro clima®

Intelligent airtight and windtight building systems

Voted No.1 Airtight System

By the German independent consumer testing organisation 'Stiftung Warentest'

- Moisture management by Intelligent diffusion
- Ensures optimum insulation performance
- Saves energy and reduces carbon emissions
- Optimum protection against condensation

PASSIVE HOUSE ASSOCIATION OF IRELAND

Passivhaus Trust MEMBER

A winning combination

easterly sunshine, so they heat up naturally in the morning while avoiding the hot afternoon sun.

This simple design strategy cuts the need to heat the school up in the morning by a quarter. But it's hardly a new idea for the department — it's been a feature of all new school buildings since 2004.

Lighting and ventilation is largely passive in both schools too. The compact plan eliminates deep-lying areas, so teachers can ventilate classrooms simply by opening the windows. The building management system (BMS) also automatically opens windows if carbon dioxide levels, humidity, or temperatures get too high.

And when it gets too cold to open windows, the BMS switches on the mechanical heat recovery ventilation, which extracts warm, stale air from the circulation spaces in both schools and uses it to preheat fresh air that's delivered into classrooms.

Clerestory windows deliver sunlight deep into ▶

(above and below) each school has four classrooms, designed to make the most of natural lighting and ventilation; (p55) both Scoil Mhuire in Moynalty (bottom) and Powerscourt NS (top) are almost identical in their design and use of materials

TOSHIBA

TOSHIBA AIRCONDITIONING

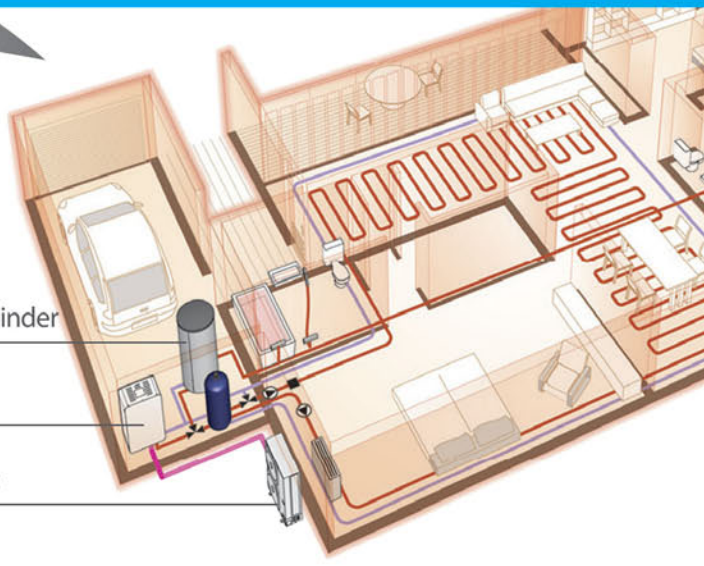
Advancing the *eco*-evolution

ESTIA

Welcome Estía to your home!
Air-to-water Heat Pump System

- World-leading energy efficiency – COP of 4.66 *
- Comfortable heating & hot water supply
- Versatile installation & operation
- DC twin rotary compressor innovation
- DC inverter technology
- Ideal ecological & economical solution for your home or business

*11kW model



Outdoor unit

Hydro unit

Hot water cylinder

GT PHELAN Est. 1970

T: 01 286 4377 | E: info@gtphelan.ie | www.gtphelan.ie

"The air & the atmosphere is so much healthier for the children"

the rooms, and the design team optimised the position and size of windows so that artificial light isn't needed 70% of the time the rooms are in use.

Superinsulated & airtight

Of course the backbone of any passive building is insulation, and methodical attention to airtightness and thermal bridging.

Both schools were built with a single wall of hollow concrete block, with a beefy 200mm of external Kingspan phenolic insulation. The ground floors are insulated with 220mm of rigid high density insulation, while the roofs have 300mm of Rockwool underneath another 120m of rigid Kingspan insulation.

The windows at both schools are triple-glazed, a standard feature on all passive buildings.

At Scoil Mhuire, Harmon Vindeur supplied and installed the windows, fitted with Pro Clima tapes for airtightness. At Powerscourt, Pazen installed their Premium Maxi glazing system, which features FSC certified hardwood and aluminium cladding, and airtightness tapes too.

Perhaps the biggest challenge on both schools was hitting the tough airtightness standard of 0.6 air changes per hour during a pressure test. Along with Pro Clima tapes at key junctions, the wet plaster serves as the airtight layer in the walls, with an Intello airtight vapour membrane in the roofs.

Careful detailing was vital for airtightness. At both schools the ceiling — with its light fittings, wires and ventilation ducts — is suspended under the membrane to avoid any services piercing the airtight layer.

Scoil Mhuire got 0.54 air changes per hour (ACH) on its first airtightness test — the best result for any school in the country. Powerscourt got 0.8 on the first go, and after three more tests it snuck over the line.

Pat Kelly of the department's architectural team says the key to hitting the passive house standard is greater awareness of cold bridging and airtightness. But he stresses that it's just as important to be aware of these factors in non-passive school building projects too.

Hitting passive airtightness standards demands that contractors manage a site methodically too.

"During the induction process everyone was made aware that we were building a passive building and that certain elements of the fabric of the building were critical," says Don McMahon, site manager at Scoil Mhuire with contractor Purcell Construction

"The whole workforce on site bought into the passive nature of the building," he says. Purcell also appointed Building Envelope Technologies as airtightness consultant from an early stage.

"We would have had detailed drawings from the department, but you need to make sure you get the practical application right," Don says.

Being vigilant on site was crucial to making sure the airtightness standard was met. "I developed a good sergeant major technique!" he jokes.

"We policed it on a daily basis – you're always being vigilant for possible lapses. If people know their work is going to be inspected, they're going to make sure it's to standard."

Don says the design team made all tradesmen on site aware of the need to hit passive standards, and all were vetted for quality. Purcell also introduced a certification process, meaning when a tradesperson finished with one room, it had to be signed off before anyone else started work there.

Building a passive school was a learning experience for him, too. "I felt when I was going to Moynalty that it would be an education, and education is never a burden to carry, it's another string to your bow," he says. "Every day you learn something new."

The design team also carried out thermographic surveys on the schools too, to identify points ▶

(above) the school's lighting system is designed to reduce electrical use, whereby sensors automatically turn the lights down, or off, if there's enough natural light or if the room is empty; (below) clever detailing at Moynalty where the services sit on a suspended ceiling detailed not to puncture the airtight layer; (p59 double height halls in Moynalty (below) and Powerscourt (above)

where heat was escaping. "We found that very useful for snagging and that," says John Dolan, senior engineer at the Department of Education and Skills, and the co-ordinator of its energy programme.

Renewable energy

The passive house standard aims to deliver buildings that need practically no artificial heating, but the schools have small wood pellet boilers should they need it. These supply low temperature radiators, and digital thermostats in classrooms allow teachers to control the temperature.

One green technology you won't see at Scoil Mhuire or Powerscourt is solar thermal panels — John Dolan says they're not really suitable for schools.

"There's a mismatch between solar thermal and school timetables," he says. Because the schools are closed during the summer, a solar thermal system would produce most hot water when there's no one around to use it.

Solar thermal also tends to go hand in hand with big storage tanks – especially if there's not an immediate demand for hot water – which would need to be kept hot during much of the academic year to protect against the risk of Legionella, adding to costs for the schools.

But both schools have electricity-producing 6 kW solar photovoltaic systems. Unlike hot water, schools still need some electricity during the summer, such as for lighting and ventilation.

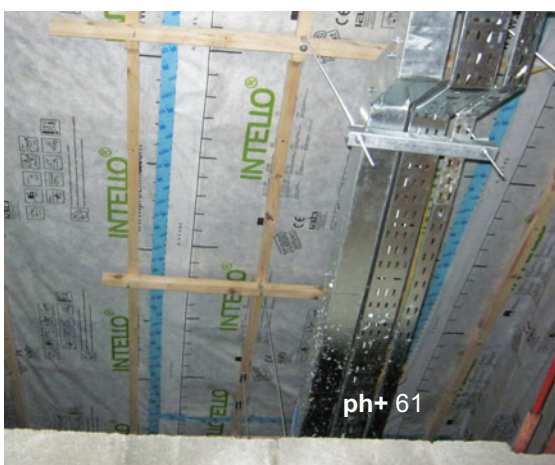
"These were two of the schools picked as part of the overall PV research programme we're conducting," John Dolan says. "It's part of our ongoing research into near zero carbon schools."

The school's lighting system is also designed to cut electricity use. Occupants must flick a switch if they want artificial light, but sensors automatically turn the lights down — or off — if there's enough natural light, or if the room's empty.

Rainwater is recovered for use in the low flow toilets, while spray taps save water too. But this attention to water saving is nothing new — the specification is standard in every new school throughout the country.

But it's not water, but energy, that will form the basis of both schools' ultimate stamp of approval — the Passive House Institute certificate that should soon adorn their halls.

The BMS system will record reams of data throughout the year, and give the design team detailed feedback on the energy and water systems. ►



PROJECT OVERVIEW:

The design, specification and materials for both schools is practically identical, so the information below refers to both schools, unless specified otherwise

Scoil Mhuire, Moynalty, Co Meath and Powerscourt National School, Co Wicklow

Building type: four classroom, single-primary school. Designed for easy extension to six or eight classrooms

Passive house certification: pending

Space heating demand: 14.8 kWh/m²/yr

Heat load: approximately 11 W/m²

Total primary electricity demand: 28 kWh/m²/yr

Airtightness (at 50Pa): Scoil Mhuire: 0.54 ACH. Powerscourt NS: 0.63 ACH.

Building Energy Rating: pending

Walls: 215mm hollow block with Weber rendered external insulation system, incorporating 200mm Kingspan K5 EWB phenolic insulation externally. 18mm nap plaster finish internally. U-value: 0.12 W/m²K

Roof: single ply membrane on roof, followed underneath by 19mm OSB, breather membrane, 120m of rigid Kingspan TR26 insulation 300mm quilt insulation between timber rafters with vapour check to achieve airtight seal fixed to underside of rafters. 12.5mm acoustic perforated plasterboard on suspended MF ceiling system. U-value: 0.08 W/m²k

Ground floor: 2.5mm selected vinyl floor finish on 150mm power floated concrete slab on 200 mm insulation rigid high density insulation. U-value: 0.12 W/m²K

Windows:
Scoil Mhuire: certified passive triple-glazed timber aluclad windows from Harmon Passiv with electrical automatic opening vents and mechanical Teleflex opening vents. Fitted with Pro Clima airtightness tapes. Overall U-value: 0.8 W/m²K

Powerscourt NS: Pazen Premium Maxi Passive House Institute certified argon-filled aluminium clad timber window with FSC certified hardwood and pre-installed airtightness tapes. U-value: 0.77 W/m²K

Roof windows: Fakro U6 thermally broken triple glazed roof windows. Overall U-value: 0.81 W/m²K

Heating system: 22kW KWB Easyfire EF2. Up to 96% efficiency rating. The Easyfire range was awarded the German Blue Angel eco label, which notes the range's energy efficiency and low emissions

Mechanical heat recovery ventilation: Kampmann unit supplied by Keane environmental (Scoil Mhuire) and Mark Eire unit (Powerscourt NS)

Solar photovoltaics: 24 Moser Baer solar PV panels, operated from two Fronius inverters. Total output approximately 6 kW. With customized Rico digital display in the school reception

Water conservation features: Rainwater harvesting supplying low water volume toilets. Blended low water volume spray taps

"Work continues even though construction is complete," says John Dolan. "Monitoring of the building performance and post-occupancy evaluation begins this academic year."

He says feedback from the project will inform future school design and identify the optimum way passive design can be incorporated into Irish schools in future.

FInal result

Gerry Dolan of Purcell Construction, contractor at Scoil Mhuire, said the company embraced the challenge of raising its game to hit the passive house standard.

"We're very proud of this project," he says. "In any project, you should always look to improve yourself. If you don't strive for improvement, you're not going anywhere."

He says the construction industry shouldn't think of passive house as a daunting and alien standard, but rather as a benchmark of quality which can be achieved with due care.

"All that really makes this different from other projects is the attention to detail," he says. "We're basically using most of the same products but with greater attention to detail, and making sure that detail works. That takes time, effort and commitment."

Pupils and teachers moved into both schools earlier this year, and Scoil Mhuire principal Denise Ward is thrilled with the final result.

She recalls one recent morning at 7:30am when the thermostat in her car read 6.5C, but the temperature inside — with no heating on — was almost 23C. "And I just thought, result!" she says.

"It's a very comfortable environment, there's a comfortable temperature throughout the whole place," she says. "The air and the atmosphere in the place is so much healthier for the children.

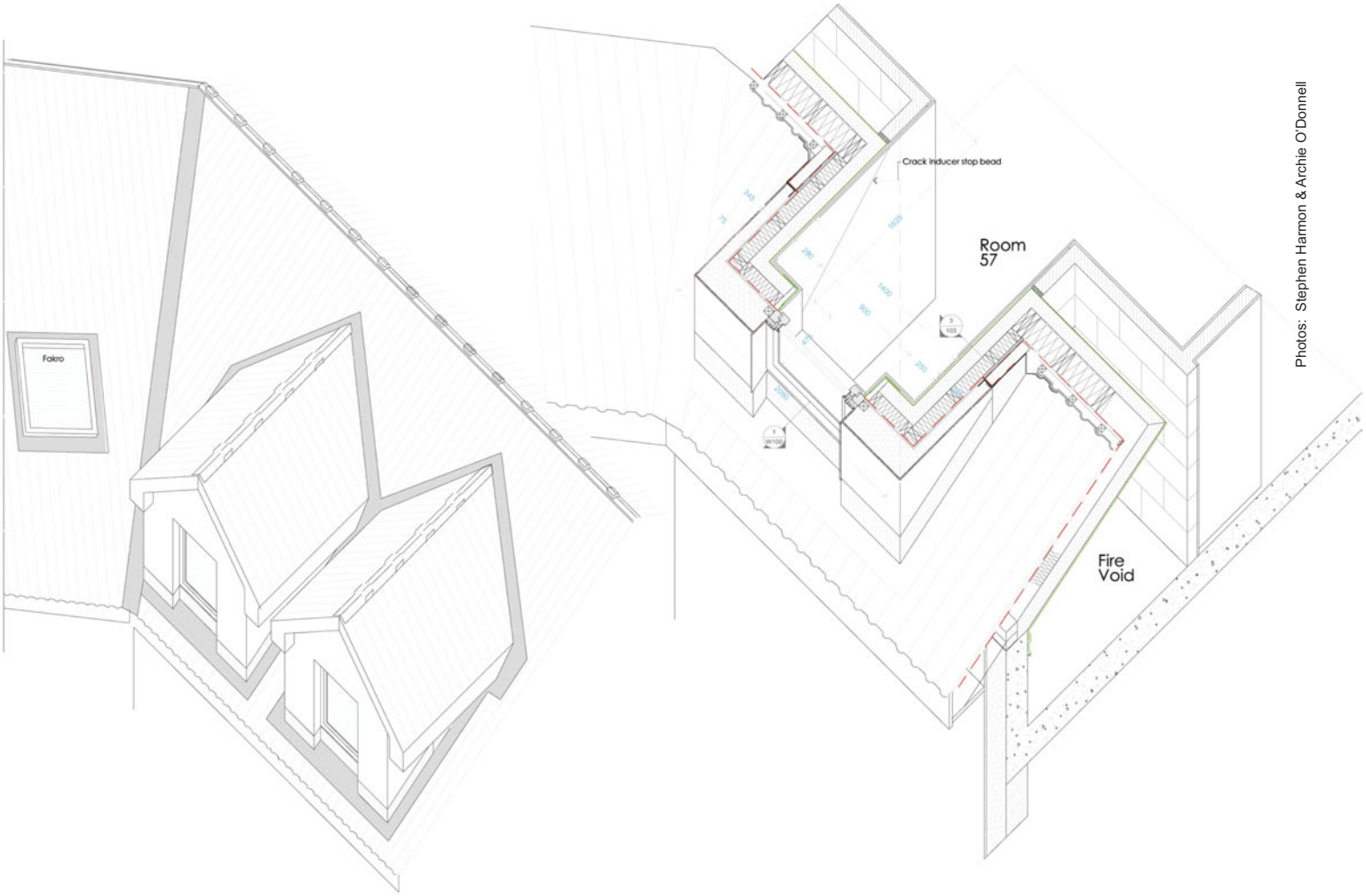
"The whole thing has been a really big learning experience for everyone, children and ourselves, and it will continue to be I'm sure." Six year olds have even learned the word 'photovoltaic', she says.

"The building itself is not just a place of education," she adds," the building is an education."

SELECTED PROJECT DETAILS

The details below apply to both projects unless stated otherwise

Clients: Scoil Mhuire, Moynalty, Co Meath and Powerscourt National School, Co Wicklow
Architects and energy programme coordinator: Department of Education and Skills
Contractor (Scoil Mhuire): Purcell Construction
Contractor (Powerscourt NS): Glenman Corporation
Civil & structural engineers: ORS Consulting Engineers
Mechanical & electrical engineers: Axis Engineering
Mechanical & electrical consultant (Powerscourt NS): Galileo Energy Services
Quantity surveyors: Nolan Ryan Tweeds
Passive house consultants: MosArt Ltd
Mechanical contractor: GT Mechanical
Electrical contractor (Scoil Mhuire): CTS Electrical & Mechanical Contractors
Electrical contractor (Powerscourt NS): Enersave
Airtightness consultancy & testing: Building Envelope Technologies
Roofing contractor (Scoil Mhuire): C & S Roofing
Insulation: Kingspan
Floor insulation (Powerscourt NS): Xtratherm
Additional roof insulation: Rockwool
External insulation system: Weber
Airtightness products: Ecological Building Systems
Perinsul thermal blocks (Powerscourt NS): Thermal Insulation Distributors Ltd
Quinn Lite thermal blocks (Scoil Mhuire): Quinn Group
Windows & doors (Scoil Mhuire): Harmon Vindeur
Roof windows: Tradecraft
Windows and doors (Powerscourt NS): Pazen
Vinyl flooring: Gerflor
Carpets: AML Architectural
Wood pellet boilers: Technical Energy Solutions
Photovoltaic arrays: CGE Coolpower
Building management system: Standard Controls
Rainwater harvesting (Scoil Mhuire): Shay Murtagh
Rainwater harvesting (Powerscourt NS): Microstrain



Photos: Stephen Harmon & Archie O'Donnell

Certified passive nursing home extension

breaks new ground

As Passive House Plus goes to press confirmation has come through that an extension to a nursing home in Celbridge, Co Kildare, has become the first healthcare building – and the first extension of any kind – to become certified passive

Words: John Hearne & Jeff Colley

When Garry and Norma Gavigan decided to extend Glenashling Nursing Home in Celbridge, sustainability was at the forefront of their thoughts.

Responding to a growing demand arising from Ireland's aging population, the Gavigans saw the project as a chance to apply principles they'd picked up on their own self builds to the nursing home extension. Spurred on by the advice of Des Behan from Celbridge-based renewable energy specialists Masterheat, the Gavigans had invested in vertical borehole geothermal on one build, before building a highly insulated home with a heat pump with horizontal collectors and a solar thermal array.

The couple resolved to apply sustainable energy principles to the nursing home extension, with rising oil prices and the broader issues of sustainability playing on their minds.

According to Garry Gavigan, building to the passive house standard was part of an overall vision to deliver a high standard for individualised care that meets the needs of each resident.

"We didn't just build this as a passive house for no reason," he says. "The comfort and indoor air quality the passive approach brings is part of our commitment to taking care of our residents."

On top of Ireland's international commitments to reduce environmental impacts, Gavigan was conscious that legislative requirements

for health care buildings were changing while the project was being planned. The 2007 Health Act – given practical effect by The HIQA standards in 2009 – set requirements for the design and layout of healthcare buildings, with guidance set in terms of thermal comfort, ventilation and the overall quality of the care environment.

An approach that simultaneously ensures consistently comfortable temperatures along with controlled air change rates, passive house enabled Gavigan to exceed many of these requirements.

Like so many projects, this was a build bounded on all sides by constraints – budgetary, planning, regulatory – ever before it was decided to aim for passive. The fact that the project team managed to deliver a passive certified extension with limited extra budget and time, while the existing building continued in full operation – is testament to the quality of the people involved.

This is a 23 ensuite bedroom extension to an existing nursing home at Celbridge, Co Kildare. The new, two-storey structure is linked to the existing building – which also had an existing attic converted and energy upgraded, albeit not to passive levels – while a separate store, plant room and single apartment building were also constructed. In addition to the new bedrooms, a new kitchen, dining room, living spaces, sluice room, storage rooms and laundry room were built, along with site works and mechanical and electrical installations. ▶

M D Y CONSTRUCTION

Experienced in Passive House & Part L compliant construction







- Established 1985
- Public & Private Sector Work including: Schools & educational facilities
- Healthcare
- Commercial buildings & offices
- Residential & housing developments
- Food production facilities
- Restaurants & retail outlets
- Hotel & conference facilities
- Heritage works
- Leisure & sports facilities
- Large-scale warehousing & distribution facilities
- Demolition & refurbishment
- Waste facilities – MRF, Composting, Wastewater treatment
- Civil works, including drainage systems & roads
- Repairs & maintenance

RECENTLY COMPLETED PROJECTS:

- **Glenashing Nursing Home** - 23 ensuite bedroom extension to passive house standard.
- **Hawkfield GAA** - Centre of Excellence Training Ground for Kildare County.
- **Presentation College Bray** - New second-level school, all-weather pitches, demolitions, refurbishment.
- **Respond, Cookstown Way Tallaght** - 161 units with residential, care facilities, independent living, creche, community building, treatment rooms.
- **NUI Maynooth Phoenix Restaurant** - Student facility catering for 650 in restaurant, café, and private dining in landscaped setting.
- **Gaelscoil Uí Cheadaigh** - Refurbishment and extension to existing primary school.
- **Mc Donald's, Airside Swords** - Stone clad, drive-through outlet in busy retail park.





STAPLESTOWN, NAAS, CO. KILDARE | T: (045) 909 800 | E: post@mdy.ie | www.mdy.ie

(above) the new 23-bedroom, two-storey extension is Ireland's first certified passive healthcare building; (below) windows are triple-glazed aluclad units from Harmon Vindeur; (pp64-65) careful detailing was required to prevent cold bridging and air leakage at the building's many dormer windows; (p69, top) thermal bridge free starter angle with closed cell EPS below; (inset) windows bracketed onto blockwork to create continuous thermal layer; (below) details and thermal analysis of the new build connection to existing cavity wall with external insulation overlapping to prevent cold bridging

Gavigan emphasises that the aim was to build to passive levels from the outset, but was faced with constraints due to the existing building and the site layout. Mel O'Reilly of contractor MDY Construction acknowledges that these restrictions added challenge to the build.

"You're now trying to incorporate airtightness details and insulation and everything else that goes with it into a structure that was not originally designed to accommodate them," he says. MDY had however amassed considerable experience in low energy builds. Now, with the addition of Jay Stuart of DWEcoCo and Archie O'Donnell of Integrated Energy as passive house consultants, the team began working through the design to methodically work through the details and make sure passive house was achieved. "The whole team pulled together to deliver on the detail," says Gavigan.

Gavigan also brought in Jim Clarke as project manager. "Under the watchful eye of Jim Clarke and MDY Construction, everyone worked together as a team," says Gavigan. "It was so heartening to see the level of skill, knowledge and expertise that was applied by the different trades at all stages during construction."

Archie O'Donnell of Integrated Energy says that his initial job was to work through the range of components and details needed to achieve passive house levels. "We came up with a specification, MDY Construction then priced it, and they were very quickly able to tell us if it was within budget. We had to make decisions on what combination of components would get us passive but would stay within budget."

The agreed construction method – nine inch concrete block laid on the flat with 220mm of external insulation – not alone provided a highly buildable, on-budget structure, it also had the advantage of taking insulation off the critical time path. Airtightness in the new build was achieved with the combination of a wet plaster finish on internal walls, and Intello membranes and tapes in ceilings and at key junctions.

The devil however, was in the detailing, particularly when it came to interfacing the existing cavity wall structure with the new build. How was this managed? "With difficulty," says O'Donnell. "In particular, MDY had to maintain fire access from the existing building, so they had to be very careful how they staged the process. Then we had to provide details for absolutely every junction within the building." ▶

www.xtratherm.com

Xtratherm®
More than insulation

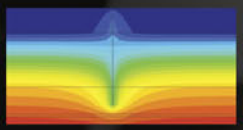
Expect More KNOWLEDGE

We have taken the unique industry step of training every one of our technical team that deals directly with our customers to industry recognised BBA standards of competency in U-value calculation and condensation risk analysis.

We've Thermal Bridging covered also - we were the first to be assessed and certified by the BRE using the most comprehensive 3D software available. We were also first to be accredited under NSAI Thermal Modellers Scheme for Ireland.

Whenever you call and whoever you speak to you will be guaranteed consistently high technical advice that you can rely on.

You can expect more from Xtratherm



BRE Competency: modelling construction details and so determine their linear transmittance Ψ, and temperature factor f. to BR497

Members of Passive House Platform Belgium

T: + 353 (46) 906 6000
T: + 44 (0) 371 222 1033

Speak to any one of our BBA qualified Technical Team members
We're here to help!

BBA BRITISH BOARD OF AGRÉMENT
Technical Approvals for construction

The high number of dormers also generated a lot of deskwork as details were worked though.

The combination of Quinn Lite blocks, low thermal conductivity wall ties and this endless succession of carefully engineered details did succeed in eliminating almost all of the thermal bridges in the build.

A meticulous approach on site ensured that the details to tackle cold bridging and airtightness made the transition from drawings to something more tangible: the finished building. “Looking at the work on the likes of the dormer windows,” says Gavigan, “the detail and the level of accuracy was absolutely amazing.”

Both Jay Stuart and Archie O’Donnell note too that the fact that the main contractor was familiar with and understood the importance of airtightness was central in achieving such high results. Getting it right presented a range of challenges. In addition to marrying old and new structures, the commercial scale kitchen and laundry rooms meant there were far more penetrations than you would have to deal with in a residential project.

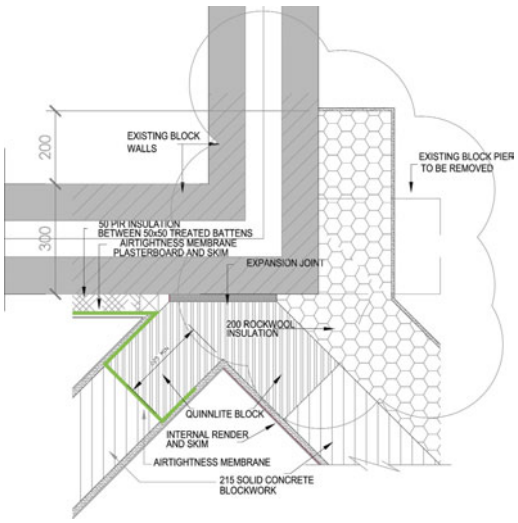
Brian Shannon of airtightness consultants Building Envelope Technologies visited the site at an early stage, pinpointed particular areas of concern and instructed the workers on site as the project went on. “We always get him out at an early stage,” says O’Reilly. “We find it valuable to have him as early as possible, engaging with the subcontractors and operatives on site.”

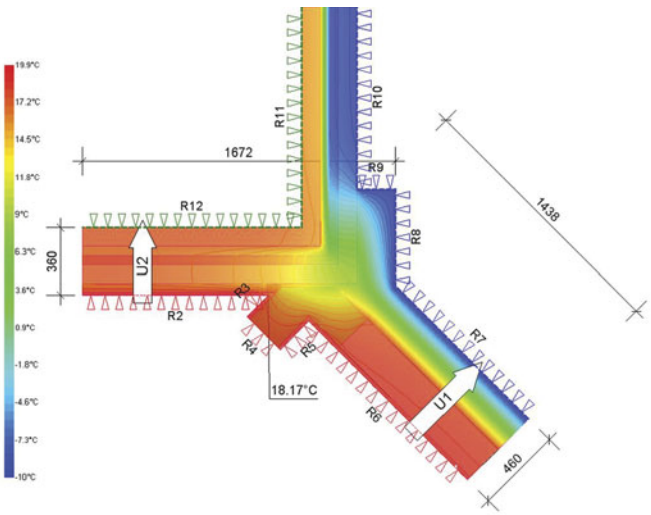
Particular problems arose in making the lift shaft airtight. Because of the number of fixings here, the design team originally planned to coat the shaft with an airtightness epoxy. It didn’t work. “That was quite a learning experience,” says O’Donnell. “There was no other way of doing it but by getting guys in there, getting a fan in place and just working to make sure that all the gaps are sealed.”

Mel O’Reilly says that Gavigan’s resolve to build passive was a key factor in ensuring the building delivered its potential. “A lot of the time clients look at the bottom line and look at delays but on this project, the client was very keen to achieve the end result, and keen too to take on board advice from the consultants involved. That was a big plus.”

The current president of the Master Builders & Contractors Association – a constituent association of the Construction Industry Federation representing general contractors – O’Reilly believes the industry is ready for passive house. “The industry is gearing up and actively participating in the delivery of new technologies and wants to provide this type of building,” he says. “I know from talking to my colleagues around the table, we’re all determined to provide more energy efficient buildings. In particular we see a real need for the development of a retrofit programme for public and private buildings.”

According to O’Reilly, the experience that the industry stands to gain by building to passive house levels could be a decisive factor in creating an industry with the knowhow to deliver successful energy efficiency interventions across Ireland’s building stock. “If you take passive house as the pinnacle of low energy building, it becomes a yardstick against which you can measure the delivery of other energy efficient projects,” he says. “It changes the mind set and skill set. After you’ve achieved passive house, a high level of energy efficiency is ▶





much more achievable than before." O'Reilly says that the knowledge picked up on the nursing home will be retained within MDY for future projects.

Jay Stuart points out the typical temperatures in nursing homes tend to be up around 24 degrees. "They need to be that high because most nursing homes have cold bridges everywhere and they're not airtight. To compensate for the draughts you have to have a higher internal temperature and the heating bill is huge."

These issues are completely neutralised in Celbridge. "You'll have higher temperatures on all surfaces inside the building and people will just feel naturally more comfortable. And you won't need a heating system because it's a passive house," he says.

"The response from the first residents who've moved in has been fantastic"

With the extension's passive house certification being confirmed just as Passive House Plus goes to print, Gavigan says Ireland's first certified passive healthcare building is already proving a hit. "I'm delighted with the certification." he says. "The response from the first residents who've moved in and from their families has been fantastic."

PASSIVE HOUSE CONSULTANT'S STATEMENT
By Jay Stuart, DWEcoCo

With planning consent for an extension to the nursing home nearing the end of its five year life, the client decided to build to the passive house standard. The design team he had at the time had no experience of passive house construction or low energy design and were struggling to get good advice. I was invited to join the team as the passive house consultant and proposed a simple, practical and cost-effective approach to going passive, including external insulation on blockwork. I was pleased when MDY Construction were selected as the contractor, as six years ago they very successfully built the Easton Mews low energy housing I had designed in nearby Leixlip.

The planning permission included some aspects that were less than optimal for passive house design, perhaps most notably in the form of many dormers, which are known to present cold bridging and airtightness problems. Potential problems like this can usually be overcome, with a little knowhow and application. In a sense the dormer detail was relatively painless, as it was a repeating detail. Once the first dormer was detailed for airtightness and thermal bridging, it was down to workmanship on site to achieve the standards.

The passive house standard isn't just about the envelope – it also requires careful design of the services to keep the total primary energy use below 120 kilowatt hours per metre square per year. In this building we also needed to ensure the Health Information and Quality Authority standards were met.

The building won't need much energy to keep warm. Some heat is recovered by the ventilation system, which incorporates small water to air heat exchangers in the supply ▶

NEW Mineral Wool Insulation

G3 touch

Strong yet Gentle

We're giving you 3 Great Reasons to use G3 Touch insulation:

NEW

GUARANTEE 1 — **Great Performance**

GUARANTEE 2 — **Gentle To Use**

GUARANTEE 3 — **Good For Our Environment**

www.isover.ie

ISOVER SAINT-GOBAIN

Sustainable insulation solutions

(right) Harmon Vinduer's cill detail prevents cold bridging at a critical junction; the roof is designed to breathe to the external, with PIR inside glass wool inside a breathable underlay; (p71, top to bottom) the airtight membrane was applied in sections, so that its continuity wasn't disrupted by collar ties; strips of Intello separate the external and party walls

PROJECT OVERVIEW:

Building type: two-storey nursing home extension with 23 ensuite bedrooms

Location: Oldtown, Celbridge, Co Kildare

Completion date: May 2012

Budget: undisclosed

Passive house certification: certified

Space heating demand (PHPP): 13.1 kWh/m²yr

Heat load (PHPP): 8 W/m²

Airtightness (at 50 Pa): 0.6 ACH

Energy performance coefficient (EPC): 0.38 (Neap demonstrating compliance with Part L)

Building Energy Rating (BER): A3 (74.6 kWh/m²/yr)

Thermal bridging: first course of Quinn Lite blocks, low thermal conductivity cavity wall ties, thermally broken window frames, insulated reveals. Y-value (based on ACDs and numerical simulations): 0.08 W/mK

Ground floor: 200mm PIR insulation by Xtratherm and 60mm Kingspan insulation. U-value: 0.105 W/m²K

Walls: 9 inch dense concrete block on the flat wet plastered internally with Tescon 1 airtightness tapes, with 220mm of high density Rockwool external insulation with Jubizol EWIS and pebble dash finish. U-value: 0.13 W/m²K

Roof: Solitex Plus roof underlay on rafters with 220mm of tightly packed Metac glass wool insulation. Inside that sits 100mm Xtratherm PIR insulation, behind an Intello membrane, service cavity and plasterboard

Windows: certified passive triple-glazed timber aluclad windows from Harmon Passiv. Overall U-value: 0.8 W/m²K

Roof lights: Fakro U5 triple-glazed roof lights inextension and attic upgrade

Heating system: delivery of heat by in-line duct heaters. Heating system designed by DWEcoCo

Ventilation: four Vent Axia Sentinel Totus D-ERV MAXI heat recovery ventilation units, with an EN 308 certified efficiency of 92% corrected to 80% to suit Passive House Institute extract side

Other green measures: rainwater harvesting

Existing building:

Attic space in the existing building was converted into a treatment room and physiotherapy room. This wasn't part of the passive house certification – the extension was treated in isolation

Existing roof converted from a cold roof to warm roof construction, with 220mm Metac fitted between existing rafters, and Intello membrane installed as a vapour control layer. U-value: 0.17 W/m²K

duct in each room. There's a thermostat in each room for individual control. As the ventilation system has heat recovery the supply air should be no less than 18C and this heating 'battery' can easily lift the air temperature up to 21C, the expected normal indoor temperature. It's worth noting that 21C is a much lower temperature than is typically needed to achieve thermal comfort in Irish nursing homes – which like most of our buildings tend to be leaky and poorly insulated – because elderly people require higher temperatures to feel comfortable. But as thermal comfort is a combination of temperature, humidity, air movement and surface temperatures, it is possible to be comfortable at 21C in a building built to passive house standards because the other variables are already controlled.

I knew of the Blade heat server system by Zenex Technologies because they developed the GasSaver flue heat recovery system I had used in Easton Mews. This gas boiler system is most efficient when delivering hot water, which a nursing home needs in abundance. I proposed the system to the team and, after much research, it was installed. This is the first Blade in Ireland and its high efficiency performance will provide exemplary service and low running costs to the owner because of its innovative design and use of the flue heat recovery system.

The nursing home has a commercial washing machine and clothes dryer to cope with the laundry load of all its residents. I proposed heat recovery devices for both these appliances but the team didn't implement these proposals. I know we could have made very cost-effective heat recovery devices for these appliances, which the owner says operate about eight hours a day. I estimate we would not have needed to install the Zenex Blade if we had heat recovery from these two appliances integrated with a buffer tank and a very small boiler. With more effort we could have developed a more cost-effective solution. Hopefully on the next project we can focus on the services from the beginning given that the envelope issues are relatively straightforward and easily achieved, with the right approach. This requires clients to employ good services engineers at an early stage of the project.

The next stage is for the owner to keep accurate records of how much energy is used in this extension. This data could be easily compared to the rest of his nursing home and if the calculations are done I would be surprised if there wasn't a very strong business case for retrofitting the rest of his buildings to achieve similar savings and levels of comfort.

The HSE – which is paying for most of these bedrooms – should require the high indoor environmental standards that are achieved with the passive house approach, as they provide a much healthier environment for our older and more vulnerable citizens. In this situation the value of healthier indoor environments is far greater to the state than the energy saving is for the nursing home business. Fortunately there is no conflict in achieving both objectives.

SELECTED PROJECT DETAILS
Clients: Garry & Norma Gavigan
Project management: Clarke Partnership
Architect: Gavin Byrne
Architectural technician: Hugh O'Daly
Consultant structural & civil engineers: MTW Partnership
Consultant fire safety engineers: Ger Sexton & Partners
Consultant mechanical & electrical engineers: Malone Engineering
Passive house consultants: DWEcoCo
Passive house assessors: Integrated Energy
Passive house certifiers: MosArt Ltd
Building contractor: MDY Construction Ltd
Mechanical contractor: PJ Duffy
Electrical contractor: AJ Electrical
Quantity surveyors: Neil Lynch
Airtightness consultancy & testing: Building Envelope Technologies Ltd
Windows & doors: Harmon Vinduer Ltd
Roof lights: Fakro by Tradecraft
Airtightness products: Ecological Building Systems
Airtightness & roof insulation installation: Munster Insulation
External insulation: Durkan Ecofix
Additional insulation: Isover, Xtratherm & Kingspan
Thermal building blocks: Quinn Lite
Heat recovery ventilation installation: Ollie McPhillips Ltd
Heat recovery ventilation unit: Vent Axia
Boilers: Alpha Gas Saver

Detail key to low on Sligo coast

energy refurb

How do you make an old building liveable on Ireland's wind ravaged Atlantic coast? The answer lies in the envelope, with airtightness, super insulation and the eradication of cold bridges

Words: John Hearne

Photos: James Walsh

Achieving high build quality in low energy design is challenging enough. Trying to make a legacy building perform to the same standards is doubly so.

Archie O'Donnell of Integrated Energy was the energy consultant on architect James Walsh's deep retrofit at Rosses Point, Co Sligo. "It's often said," O'Donnell explains, "that when it comes to a low energy renovation, you'd have put together a tender package for an office block or an apartment block in half the time."

Because every refurb is different, the architect has to come up with a range of solutions for all kinds of issues – from airtightness to cold bridging to preserving the insulated envelope – and very many of these will be particular to the project.

As is typical of so many low energy retrofits, the success of the Rosses Point building hinged on the fact that there was one man at the centre of the project to do two things – co-ordinate everyone involved, and drive the high standards required. Architect James Walsh took that role.

"We didn't set out to design passive," says Walsh, "but to deliver the principles of it."

Eliminating cold bridges was the biggest challenge he faced. In particular, marrying the existing cavity wall with the new structure generated huge volumes of work. Walsh drew up well over thirty separate construction details specifically to deal with thermal bridging issues. These details covered the likes of new and existing rising walls, the eaves for both the flat and pitched roofs, along with chimneys, roof-lights and a lot more besides. The process of refining these details down from first draft through to final version was equally exacting, requiring extensive co-ordination between architect, engineer, builder and key installers, such as in the case of windows and external wall insulation.

Once agreed beforehand, these drawings then became central to the day-to-day building work. "Communication with the builder happened on the drawings," O'Donnell continues. "The architect insisted on that. He didn't want to be trying to explain things over the phone to a builder on a windy scaffolding in Rosses Point. It was on detail, it was priced, it was agreed, it was workable."

O'Donnell points out that passive house and ▶

Future-Proofing Today's Airtight Homes

NEW High Efficiency, Low Energy MVHR systems, including Passive House accredited

Central Vacuum Systems

- Improve indoor air quality by up to 52%
- Quiet, powerful and easy to use
- Deep and complete cleaning for every surface
- Built-in value for money

Central Ventilation Systems with Heat Recovery

- Fresh, filtered air reduces allergy symptoms
- Controls condensation and prevents mould and mildew
- No extractor fans or trickle vents needed
- Saves energy with highly efficient heat recovery

energy saving trust

Component Suitable for Passive Houses
Dr. Wolfgang Feist

Contact us now for a no-obligation design/survey & quotation.

BEAM
Vacuum & Ventilation

35+ years of successful trading in UK & Ireland. 60,000 satisfied customers. Full design, sales, installation & service available countrywide.

Freephone [NI/UK] **0800 78 38 231** Freephone [ROI] **1800 20 10 67**
Email: **info@beamcentralsystems.com** Web: **www.beamcentralsystems.com**

TARGET ZERO

Passive House Design Continuing Education

PASSIVE HOUSE TRAINING SPECIALISTS

- Certified Passive House designer/consultant
- Certified Passive House tradesman course
- Passive House planning package workshops
- 2D & 3D Thermal bridging analysis
- In-house training

CONSULTANT
CERTIFIED PASSIVE HOUSE CONSULTANT
CERTIFIED PASSIVE HOUSE TRADESPERSON
TRADESPERSON

www.targetzero.ie
www.passivehousetradesmen.com

Courses in the UK & Ireland Nationwide

PVTech

- Photovoltaic Modules
- Mounting Systems
- PV Cable Systems
- Grid Tie Inverters
- Complete PV Kits

EMPOWERING the Solar Age

Kiltrogue, Claregalway, Co. Galway
Republic of Ireland.

ROI Tel: +353 (0)91 395 950
UK Tel: +44 (0)28 7187 8679
Fax: +353 (0)91 394266
Email: info@pvtech.ie
www.pvtech.ie / www.pvtech.co.uk

Q CELLS MODULES · REC · Steca · K2 · MASTERVOLT · SOLTECTURE · Multi-Contact · MC

EnerPHit (passive house refurb) buildings are in a different league to traditional Irish construction in terms of detail. “They’re not your Homebond solution, there’s no guidebook on it. Every detail seems to be unique, so it really has to be teased out before a builder sets foot on site.” Working out details in advance does bring obvious advantages though. “If the architect’s details are cognisant of airtightness and thermal bridging, it means you’re not going to get large cost variations on site,” says O’Donnell. “It makes for a smoother build process.”

It’s also essential to bring everyone along with you. Contractor Stephen Taylor had worked on low energy buildings before, and he too pays tribute to James Walsh’s rigour in getting every aspect of the building nailed down on paper before a block was laid.

“I’m at the structure end of it and all I want to do is get the roof covered and move on. James will always be there asking ‘Well, if we put that piece of timber there, how does it affect my insulation?’”

Similar questions arose in relation to ventilation ducting. In an airtight building, ventilation is paramount. The heat recovery ventilation systems typically specified for low energy and passive structures require space for ducting runs.

“To get it out of sight you’re going up across rafters,” says Taylor. “James asked, ‘Well ok, what does that do to the insulation? If it’s reducing the insulation at one part, how do we change the insulation there to compensate for that?’ So there’s a lot of thinking going on all the time.”

Taylor says that if eliminating cold bridges is the primary challenge in low energy retrofit, achieving airtightness is at least a close second. Everyone has to buy in to the idea.

“Me and the guys working with me, we’ve got to understand what we’re trying to do here, because before you ever work with it, airtightness seems silly,” he says. “You think, what are they trying to do here? It’s just more expense. It’s only when you go back to an airtight house afterwards and you feel the benefits that you realise how important it is.” Now a full convert to the process, he believes that airtightness may be more critical to delivering a comfortable home than insulation, particularly on the windy west coast.

There is a view emanating from some industry guidance posits that in mechanically ventilated buildings an airtightness of three air changes per hour under pressure test conditions represents “best practice” – an assertion which sounds dated given the growing number of buildings beating the passive house standard, which sets the bar at a level that’s a full five times more airtight. O’Donnell stresses that even if you don’t believe an air change rate of less than 3 ACH is needed, it’s still very useful to aim for passive or EnerPHit targets. It sets a visible benchmark for the project and sends the signal to everyone involved that quality is being monitored.

“If a builder has a problem with that, then you need to look more closely at why he has a problem and what his agenda is. Most builders now do buy into that and when they go to the next job, they will find it useful to boast that they have achieved this level of airtightness because it’s now seen as the industry measure of quality.”

“Once upon a time, if you were asking someone about a builder, you’d ask, what are they like for variations? Now, the first question is what kind of airtightness are they getting.”

ARCHITECT’S STATEMENT
James Walsh, Low Energy Design
Refurbishing and extending your home can be a daunting challenge for the homeowner, even more so when embarking on a deep retrofit that involves upgrading or replacing the majority of the building fabric. The clients at Rosses Point embraced the concept of thermally upgrading, a decision made easier by their experience of the thermally poor building fabric – including a winter lived with frost on the inside of their single-glazed windows.

The original dwelling was a 1950s pitched roof cavity wall structure facing south that had flat roofed extensions to the east and west along with a conservatory that had been subsequently added. Some investigative work was undertaken at planning design stage to check the wall build up, leading to the discovery that the cavities were predominantly empty.

We retained the dwelling footprint while adding a small extension to the east for a bedroom, and replaced a single glazed conservatory with a pitched roof glazed family room. ▶

(below, from left) triple-glazed windows bracketed on to blockwork maintain a complete thermal layer, level with the external insulation; Sto’s adhesively fixed system avoids the cold bridging of mechanical fixings; new concrete floors were insulated with Xtratherm insulation with careful perimeter detailing; (top) the house in its original state; (p79) attention to airtightness detailing was important throughout the build, with proprietary products used around floor and roof joists, and window junctions

The Icynene Insulation System®

Healthier, Quieter, More Energy Efficient®

- Soft, flexible spray foam insulation
- Ideal for Residential, Commercial, Industrial Projects
- Locks out dust, allergens, odours & pollutants - environmentally safe
- Delivers advanced moisture management
- Controls interior & exterior noise through walls & floors
- Up to 50% energy savings over conventional insulation
- Suitable for closed cavities & existing buildings
- Perfect fit every time
- Lifetime guarantee
- IAB approved
- BBA approved for applications to roof membranes and felts
- ETA approved

For further information and a list of professional installers contact **GMS Insulations Ltd**
Tel: 00353 49 4335057 | Mob: 00353 87 2394962 | Email: info@icynene.ie or technical@icynene.ie

www.icynene.ie

MAGNER HOMES

Passive & Energy Efficient Home Builders

Magner Homes is a Cork based building company that specialises in building Passive homes and energy efficient homes. Whether you want a fully certified Passive home or a home built to the maximum energy efficiency within your budget, Magner Homes will have a solution for you – be it concrete built, timber frame or ICF.

Affordable Passive Homes:

Passive is truly affordable with Magner Homes. Our Passive homes average build cost is less than €100 per square foot. By involving Magner Homes early in the process we can help with the design and specification to ensure that your home can be built efficiently and within your budget.

Why choose Magner Homes:

- Artisan level quality
- Fixed price contracts
- Fixed completion dates
- Project professionally managed
- Affordable Passive Homes
- Concrete & timber frame
- Proven track record
- Turnkey homes
- Green Awards finalists 2012

Contact us for a free consultation and quotation

GREEN AWARDS 2012
The Green Residential Building
FINALIST

International PASSIVE HOUSE Association

PASSIVE HOUSE ASSOCIATION OF IRELAND

T 022 27494 | E info@magner.ie | W www.magner.ie | A Churchfield, Castlemagner, Mallow, Co. Cork

External wall insulation was agreed as the most appropriate solution to thermally upgrade the existing walls with cavities filled with Ecobead. The existing roof spaces had very low ceiling levels, which were replaced to provide habitable accommodation that also takes advantage of the southerly aspect and views. Existing flat roofs were upgraded to warm roofs.

Attention to airtightness detailing was paramount throughout the build. Membranes were dressed around floor and roof joists at an early stage to ensure simple sealing further on. Close cooperation and detailed discussion – involving contractor Stephen Taylor, Sto external insulation installer Michael O'Donnell of Atlantic Plastering, Brian Raftery of True Windows and myself – ensured the main junctions were constructed to a high standard of airtightness and thermal performance. Éasca approved airtightness consultants Ecoscan tested the fabric at first fix stage and the building achieved 1.94 $m^3/hr/m^2$ at 50 Pa. A slight improvement on this could be expected if the building had been tested post completion. A heat recovery ventilation system from another Éasca approved company – Tuam-based manufacturer ProAir – delivers fresh air to provide health benefits to the occupants.

The building has been elevated to an estimated A3 Building Energy Rating. If the existing oil boiler was replaced, it would achieve further improvement.

The owners hope to enjoy the benefits of a comfortable warm healthy home for their family for many years to come.

SELECTED PROJECT DETAILS
Clients: David & Louise McCabe
Architects: Low Energy Design, James Walsh
Contractor: Stephen Taylor Builders
Civil/structural engineer: Jennings O'Donovan & Partners Consulting Engineers
Services consultant: Meed Building Services Ltd.
Energy consultant: Integrated Energy Ltd
BER assessor: Brian Fitzpatrick
Airtightness tester: Ecoscan
Windows & doors: True Windows Ltd
External wall insulation: Sto, installed by Atlantic Plastering
Additional insulation: Xtratherm, Ecobead, Rockwool & Warmcel
Rockwool & Warmcel insulation installer: Abbey Insulation
Roof lights: Velux
Airtightness products: SIGA
Thermal breaks: Quinn Lite blocks
Solar thermal installer: Solar Energy Ireland
Heat recovery ventilation: ProAir

PROJECT OVERVIEW:

Building type: 331 sq m detached two-storey cavity wall dwelling

Location: Rosses Point, County Sligo

Completion date: August, 2012

Budget: private

Passive house certification: not certified

Space heating demand (PHPP): no PHPP analysis carried out

Airtightness: 1.94m^3/m^2/hr at 50 Pa

Pre upgrade Building Energy Rating (BER): D2 (247.18 kWh/m^2/yr)

Post upgrade indicative BER: A3 (69.98 kWh/m^2/yr)

Thermal bridging: course of Quinn Lite blocks for any new build walls at floor insulation level, aluclad window frames with insulated reveals, externally and internally, and adhesively fixed external insulation. Y-value (based on ACDs): 0.08 W/mK

Ground floor: new concrete floors insulated with 120mm Xtratherm thin-R XT/UF insulation. U-value: 0.15 W/m^2K

Walls: EcoBead Platinum blown bead EPS insulation to existing cavities with 160mm of Sto K System (adhesively fixed) external wall Insulation. Average U-value: 0.19 W/m^2K

Pitched roof: Tegral fibre cement slates externally on 50x25 battens/counter battens, followed underneath by breathable windtight roofing membrane, SIGA Majcoat, 225mm timber rafters at 400mm centres fully filled with Warmcel cellulose insulation, SIGA Majpell airtightness membrane, 50 mm Rockwool Flexi insulated service cavity, 12.5mm plasterboard ceiling. U-value: 0.17 W/m^2K

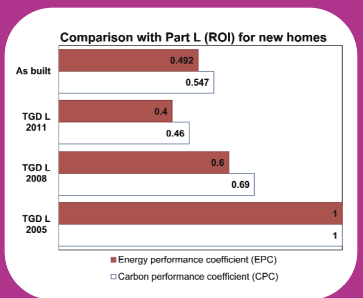
Flat roof: Soprema Flagon SR mechanically fixed roofing membrane on Xtratherm XT/FR-ALU 130mm on WBP plywood fixed to furring pieces on 150mm roof joists at 400mm centres with SIGA Majpell airtightness membrane and a 12.5mm plasterboard ceiling. U-value: 0.16 W/m^2K

Windows: Doleta triple-glazed aluminium-clad pine windows with argon filling. Average overall U-value: 1.15 W/m^2K

Heating system: existing 70% efficient oil boiler supplying underfloor heating and radiators, with a six sq m 36 evacuated tube Ritter solar CPC12 Inox system supplying Joule 400 litre twin coil unvented stainless steel insulated water tank for domestic hot water

Ventilation: two ProAir PA600 heat recovery ventilation systems and associated ducting, with a Sap Appendix Q certified efficiency of 90%

Green materials: cellulose insulation



Windy or COLD weather:

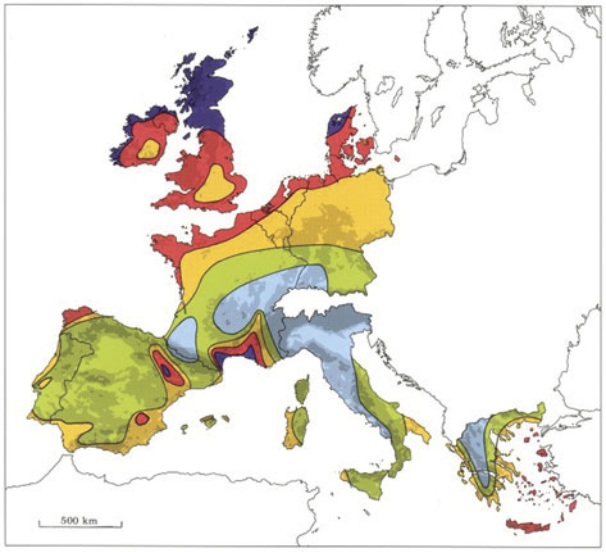


Image: European Wind Atlas map, courtesy of Risø National Laboratory, Denmark

Wind resources[1] at 50 metres above ground level for five different topographic conditions

	Sheltered terrain[2]		Open plain[3]		At a sea coast[4]		Open sea[5]		Hills and ridges[6]	
	$m\,s^{-1}$	Wm^{-2}	$m\,s^{-1}$	Wm^{-2}	$m\,s^{-1}$	Wm^{-2}	$m\,s^{-1}$	Wm^{-2}	$m\,s^{-1}$	Wm^{-2}
	> 6.0	> 250	> 7.5	> 500	> 8.5	> 700	> 9.0	> 800	> 11.5	> 1800
	5.0-6.0	150-250	6.5-7.5	300-500	7.0-8.5	400-700	8.0-9.0	600-800	10.0-11.5	1200-1800
	4.5-5.0	100-150	5.5-6.5	200-300	6.0-7.0	250-400	7.0-8.0	400-600	8.5-10.0	700-1200
	3.5-4.5	50-100	4.5-5.5	100-200	5.0-6.0	150-250	5.5-7.0	200-400	7.0- 8.5	400- 700
	< 3.5	< 50	< 4.5	< 100	< 5.0	< 150	< 5.5	< 200	< 7.0	< 400

when does heating demand peak?

Do Irish buildings need the most heat when it's coldest, or when it's milder but windy? What consequences are there for how we build and heat them? And how airtight are Irish buildings anyway?

Words: Lenny Antonelli & Jeff Colley

We naturally assume that our homes and offices need the most heat when it's coldest outside. But what if it isn't that simple?

Energy consultant Paul Overy has seen buildings in recent years where wind, rather than the temperature outside, dominates the need for heating — particularly non-domestic buildings like factories and offices, for which there is no airtightness demand in Irish building regulations.

Overy first noticed this in 1998, when carrying out dynamic energy simulations on a new 5,000 square metre school (1). "The peak heating demand occurred when it was 7°C outside and a gale was blowing, rather than when it was below freezing," he says.

He noticed something similar when his company, Overy & Associates, moved into new offices two years later. The building was very well insulated, but there was little attention to airtightness. "We installed a carefully designed radiator heating system to normal design criteria, yet the offices are cold on particularly windy days when outdoor temperatures are well above freezing."

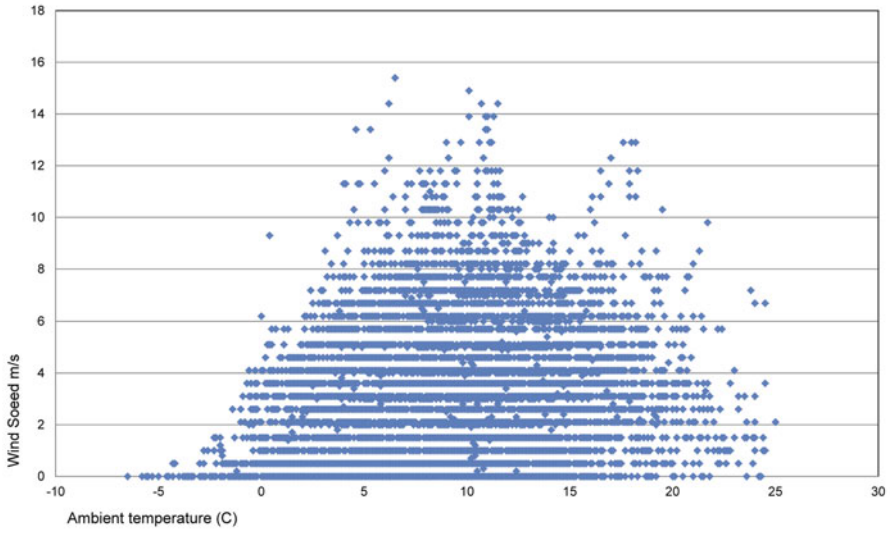
It's impossible to make sweeping statements about whether wind or temperature drive heating demand more – a complex mix of factors including insulation, airtightness and the local climate all play a role.

But there are reasons to think wind could drive heating demand in Irish buildings more than in other countries. For one, the airtightness levels of our existing building stock appear to be mediocre at best, as we explain on page 89.

The backstop required under building regulations – 7$m^3/hr/m^2$ for new homes – leaves a lot to be desired, with no standard for non-domestic buildings. Unlike insulation no grants are available in Ireland to fund airtightness upgrades – barring some rudimentary draught proofing work under the Warmer Homes scheme. Arguably it's been much more common for recently built buildings to be leaky than poorly insulated. Putting in extra insulation is relatively easy – especially if you're not paying attention to cold bridging – but it takes real attention to detail to make a building airtight.

"If new and renovated buildings are well insulated but not airtight, perhaps it's important to look at how wind speed varies with outdoor temperature," Overy says.

To shed some light on the topic, he performed ▸



IWEC weather data (Birr): typical annual wind speeds & temperatures

© Paul Overy

Passive House Academy

Your Training, Design and Certification Partner

1. Training

DESIGNER
CERTIFIED PASSIVE HOUSE DESIGNER

We have restructured the Certified Passive House Designer Course to cut the cost in half!

Courses coming soon to Dublin, Cork and Newry

2. Design

Make Mine a Passive House!

For the equivalent of what you'll save on heating in the first 18 months, we will model your house and provide a full spec on what you need to do to go Passive!

3. Certification

Certified Passive House
Passive House Institute

We are the Passive House Certifying body in Ireland and can consult and fully certify your domestic and commercial projects

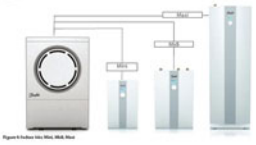
www.passivehouseacademy.ie

Email info@passivehouseacademy.ie, call 0404 25777 or text your query to 087 644 7897

Owing to the use of a heat pump, the Murphy family have cut their heating bills in half

Sarah and Niall are saving money with their new heat pump, so much so, that now their neighbours want one too.

Energy saving heating without hassle



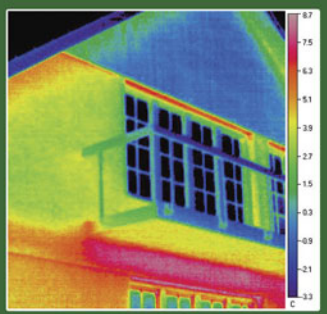
HeatDOC Ltd
Contact Damien Mullins
Email: info@heatdoc.ie Phone: 083 4205665

Specialising in Integrated system solutions for heating & Cooling

---

Specialists in Passive House Airtightness

Certified airtightness testing



Thermal imaging

The 2008 and 2011 Part L revisions require airtightness testing on new dwellings. The Passive House standard requires vastly superior airtightness on buildings where the aim is to be certified to its new build and Enerphit standards.

Whatever standard you are aiming for in your project, Greenbuild can help you to achieve your airtightness targets through plan reviews, specifications, on-site assistance to site staff, and of course, testing with various leak detection methodologies.

GreenBuild, Inch, Gorey, Co. Wexford, Ireland
t: 087 252 1032 | e: contact@greenbuild.ie
www.greenbuild.ie

CONSULTANT CERTIFIED PASSIVE HOUSE DESIGNER Certified Passive House Designer
AIR TIGHTNESS TESTING EN 13829:2000 NSAI Certified

a few calculations. First he took hourly weather data for Birr, Co Offaly, over 12 typical months of the year, and plotted wind speed against temperature. The results show that wind speed tends to be slower when it's freezing outside, while fast winds are associated with milder temperatures. This is important, as it means these two conditions —high wind speeds, and cold temperatures — can be treated somewhat separately.

Next, he used the EnergyPlus software from Lawrence Berkley Labs to simulate how much heat a leaky non-domestic building uses, and when. He found most of the demand for heat is actually when it's quite mild outside.

"If the building is dominated by wind-driven infiltration, then its main heating energy use is more likely to occur in milder weather rather than on the coldest days," he says — essentially the leakier a building is, the more heat it will need when it's windy.

He offers a simple calculation to demonstrate this. First, he took a theoretical 1,000 square metre, two-storey office building (with a floor area of 500 sq m, wall area of 432 sq m, and window area of 108 sq m). The walls, roof, windows and ground floor all meet the elemental U-values listed in the 2007 edition of Part L of the building regulations, which deals with energy efficiency. The building has a very poor airtightness of 20 $m^3/hr/m^2$ at 50 Pascals pressure.

In still conditions its infiltration rate is close to zero, because there's little wind-driven heat loss. But in strong winds infiltration could shoot up to over one air change per hour, with an associated heat loss of over 2,000 W/K. By comparison, its fabric heat loss is less than 600 W/K. The building will need significantly more heat when it is windy and mild than on cold, still days. Making the building more airtight will save far more energy than beefing up its insulation.

For his next exercise, Overy analysed the tutorial building in iSBEM, the software used to generate Building Energy Ratings for non-domestic buildings. He ran the building with the same U-values and air permeability (20 $m^3/hr/m^2$) as above, but then improved its air permeability to 5 $m^3/hr/m^2$ at 50 Pa. This cut the building's use of heating fuel by 46%.

Then he changed all the U-values from the middle of the road 2007 values to the mediocre levels found in the 1992 building regulations, while keeping the air permeability at five. Surprisingly, this only increased the building's fuel use by 8% over the base case. “There is not that much difference between 16 years of improvements in U-values, and making this building airtight," he says, with reference to this example. “Insulation is important, but so is airtightness.”

But airtightness and insulation aren't strictly separate, so deciphering how much of a building's heat loss is down to one or the other is tricky. Insulation can perform much worse than expected if it's affected by air movement. Even in a sealed cavity, this can occur if there are temperature differences that cause air to move. The effect is worse if cold external air gets into the insulated cavity, creating an open loop where one air mass replaces another.

"When air movement is sufficient, due to the wind or stack effect, an open loop can result in the complete elimination of the effectiveness of thermal insulation," architect Mark Siddall wrote in a paper on thermal bypass, published in Green Building magazine in 2009. "Wind washing can affect the thermal performance of low density insulation, short circuit the performance of insulation sheathing, and cool down an air barrier system located towards the outside of the wall assembly."

As far back as 1978, research found that a windtight wall subjected to an air speed of 2.5 metres per second parallel to the insulation suffered a 10% drop in thermal performance. But subject the walls to gaps and cracks so it's no longer windtight, and the performance of the insulation drops 40%.

Airtightness means preventing air penetrating through the building shell, while windtightness means stopping outdoor air getting to the shell. In an ideal construction, the airtight layer is usually found towards the room side of the wall build-up, with the windtight layer towards the outside.

In a 1996 paper looking at the importance of windtightness to timber frame construction, Sivert Uvslokk of the Norwegian Building Research Institute studied what happened when the barrier was subjected to leaks. He concluded that this type of "forced convection" can cause heat loss "three to ten times higher" than that calculated for windtight constructions.

Seven years before that, the Fraunhofer Structural Physics Institute in Germany studied the effect of poor wind and airtightness on a wall build-up that included 140mm of mineral wool insulation and an internal vapour barrier. The temperature inside was set to 20C, and -10C outside, with a pressure (20 pascals) equivalent to force three or four winds.

First, they studied the performance of the insulation when installed with an airtight, seamless vapour barrier. It performed as expected, with a U-value of 0.30 W/m^2C. But then they created a tear —one metre long and one millimetre wide —in the vapour barrier. The U-value of the insulation shot up to 1.44 W/m^2K. Then they made the same tear 3mm wide, and the U-value grew to an abysmal 3.3 W/m^2K.

What does this mean in an Irish context? While our climate isn't as cold as the one modeled by Fraunhofer, their research still shows the potential for air infiltration to drastically damage the effectiveness of thermal insulation.

The Fraunhofer Institute also investigated the effect such leaks have on the building structure, simulating temperatures of 20C inside and 0C outside. While the intact barrier let a small, safe amount of moisture through (0.5g/m^2), with just a 1mm gap the amount of moisture getting through increased by an astonishing 1,600 times.

Writing on the US-based homeenergypros.lbl.gov internet forums, Passive House Institute director Dr Wolfgang Feist said that energy saving was not the main motivation behind the exacting airtightness requirements passive houses must hit. The target of 0.6 air changes per hour at 50 pascals of pressure is to avoid structural damage caused by condensation. "That's the most frequent cause of structural damage in winter cold climates – and certainly also in summer humid climates," he wrote. "We can avoid such damage by using airtight constructions."

With our milder winters, Ireland doesn't suffer the same risk of condensation that's associated with freezing temperatures. But we still have to protect our buildings from the damp. And as we've seen from the non-domestic building examples above, there's reason to suspect wind could have more effect on the thermal performance of Irish buildings than in central Europe.

> “The leakier a building is, the more heat it will need when it's windy”

This raises a question: if the heating demand in many Irish buildings is peaking when it's windy, as opposed to when it's cold, should this change how we heat them? What heating devices work most efficiently in windy, mild conditions?

Paul Overy says that up till now, he's generally been "not a great believer in air-to-water heat pumps because their efficiency falls in very cold temperatures, when it's assumed buildings need most heat.”

But his mind could be changed for leaky buildings, which often need more heat when it's windy rather than cold —a typical Irish condition for much of the year. And he pointed out that on windy days, electricity has a lower carbon intensity because wind turbines are contributing more to the grid, helping to lower the carbon emissions associated with heat pumps. Of course it makes more sense to make leaky buildings airtight first, he says.

Another factor which complicates matters further is thermal comfort. According to Dr Shane Colclough of Energy Expertise Ltd and the University of Ulster's Built Environment Research Institute, recent tests at the university's test laboratory indicate a strong correlation between energy usage and infiltration. “We had mannequins equipped with all sorts of sensors for measuring thermal comfort,” he says, “and when you have it in the room you'll find all sorts of influences. If air is moving it has a ▶

significant influence. Drafts can transmit cold – and cause you to feel cold quickly."

"We had a mannequin equipped with all sorts of sensors for measuring thermal comfort," he says. "When you have it in the room you'll find all sorts of influences. If air is moving it can have a significant influence. Drafts can transmit cold, and cause you to feel it quickly."

Colclough said the work, led by Dr Philip Griffiths, found that "There's a significant difference in the thermal comfort in the room if there's a draft," meaning that occupants may need to put up the thermostat by a degree or two to feel comfortable.

Ultimately, it's important that we really try to understand the interactions between airtightness, insulation, temperature and wind speed rather than just making assumptions.

"The marketplace as a whole doesn't understand these things," he says, "and jumps to conclusions that may be incorrect, and some research wouldn't go amiss."

How airtight are Irish buildings anyway?

Currently, we don't have an accurate picture of the airtightness of the Irish building stock because, quite simply, a suitably large and representative sample of buildings hasn't been tested. What data we do have is hugely skewed.

At the time of writing, the Sustainable Energy Authority of Ireland's National BER Research tool lists 4,815 airtightness tests on dwellings in the Republic of Ireland. Of those, just over half (2,435) are for homes that were built after the end of the construction boom, and are subject to the 2007 update to Part L of the Building Regulations. These homes were legally required to have airtightness tests done – and to achieve 40% energy savings compared to previous regulations. Their average primary energy demand (for heating and cooling, hot water and lighting) was 87.5 kWh – a mid range B1 BER. But the database also includes a further 4,189 homes which were subject to the same regulations, yet failed to have airtightness tests done. The difference? Their average energy demand came in at 135.8 kWh/m^2/yr (B3) – an astonishing 48 kWh higher than the houses that had airtightness tests.

This doesn't mean that getting airtightness tests done will boost your energy rating. The 37% of projects which were tested fared so much better because they were generally compliant, and because much better attention was paid to energy efficiency generally than in the untested houses. This means that they're not even a representative sample of the historically low volume of newly built homes, let alone the entire housing stock.

This trend is repeated in older homes. 1,819 tests on SEAI's database relate to homes built to 2005 building regulations. Once again there's a huge BER split between this sample and the 34,721 untested homes, which respectively average 112 kWh/m^2/yr (B2) and 159 kWh/m^2/yr (C1). The remaining 518 tests on SEAI's database relate to any houses built before 2005 Part L, and the split between tested and untested houses is even more pronounced. The tested houses average 171 kWh/m^2/yr (C1), whereas the 270,000 untested houses average 281 kWh/m^2/yr (D2) – a full 100 kWh/m^2/yr difference, indicating that many of the former group may have been tested after extensive energy upgrade work.

If this data is clearly unrepresentative, how do we go about finding representative samples of our building stock? Perhaps unsurprisingly, the available data in this regard is severely limited. The best available Irish data appears to come from two sources.

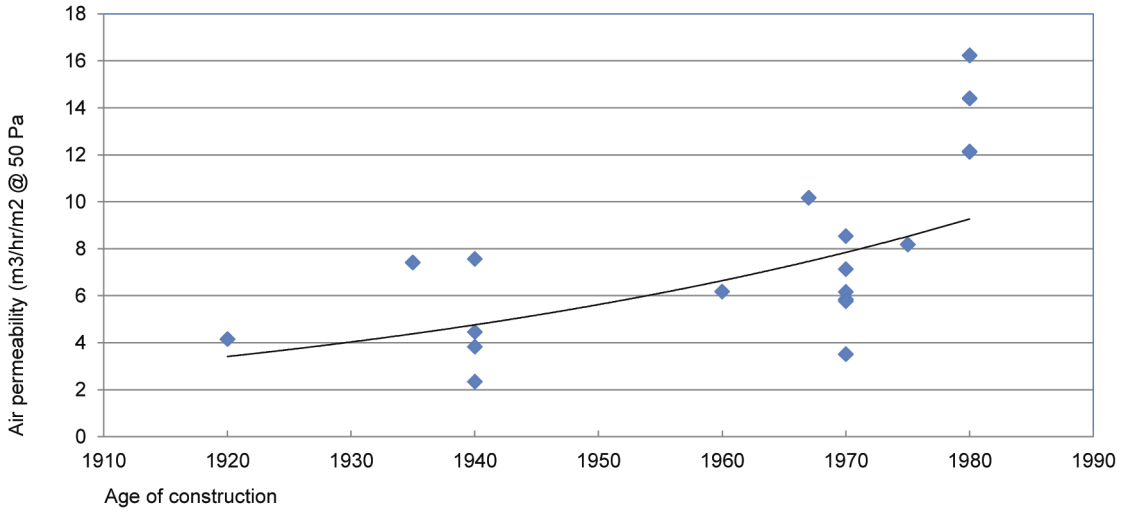
In 2010 the fuel poverty charity Energy Action carried out airtightness tests on 18 homes from the Dublin area before and after energy upgrade work, including external insulation, under a pilot phase of SEAI's Warmer Homes scheme. The sample wasn't representative of the national stock in terms of age of construction, location, tenure of occupancy or the likes, but it indicates a clear trend. The six oldest houses – built between 1920 and 1940 – averaged a fairly impressive permeability (at 50 Pa) of 4.96m^3/hr/m^2. The remaining twelve were built between 1960 and 1980, and averaged 8.69 m^3/hr/m^2.

The 2005 Codema/DIT-led Energy Performance Survey of Irish Housing included airtightness tests on 28 out of a representative sample of 52 houses built after the introduction of 1997 building regulations. The sample is admittedly small, but there is a robustness both in the selection process to ensure the sample of 52 houses was representative in terms of location, house type, tenure of occupancy & construction method, and in how the report's authors analysed the data, such as error bars to account for standard deviation. That said, the report doesn't explain whether the subset of 28 houses is representative, nor does it apply error bars to the airtightness test results. The average air permeability result was 11.8m^3/hr/m^2 at 50 Pa.

Perhaps counterintuitively, the report found no clear correlation between a building's airtightness and its heating consumption. This can at least in part be explained by the terms of reference of the study. No monitoring was done of indoor temperatures, meaning it's not possible to tell whether people in leakier homes were suffering from lower thermal comfort. No account was taken for microclimate, and the effect of site specific (or local weather station) wind speeds on the level of infiltration each house typically experiences. And although one surveyor noted that wall vents were blocked in approximately 35% of homes, this data wasn't a required part of the study, so its effect wasn't quantified. In other words, the report doesn't tell us how windy each location is, and it doesn't tell us whether people in the leakier houses were putting up with colder temperatures, or were more likely to block up vents due to thermal discomfort.

As for non domestic buildings, we've virtually no data to go on. Perhaps the best source is Brian Shannon of INAB accredited airtightness testers Building Envelope Technologies.

"We've tested in and around 15 non domestic buildings over the list six or seven months, ranging from office blocks to warehouses," he says. The results have been shockingly bad - their q50 results have ranged from 13 m^3/hr/m^2 at best to 50.1 at worst. "A lot of them come in around 21 to 22," he says. "The average would be around 20 to 25."



Energy Action Warmer Homes scheme pilot: pre-upgrade airtightness test results

glossary

Perplexed by all this talk of U-values, blower door tests and embodied energy? This first instalment of our sustainable building glossary will help you get to grips with the key terminology. These entries will be added to an online glossary on ***www.passivehouseplus.ie****, which will continue to grow in detail as each new issue comes out*

airtightness The degree of air leakage or air infiltration a building has. Making a building airtight essentially means eliminating draughts within buildings, and should not be confused with windtightness. Ideally we want to have total control over how much air we're letting in to the building through designed ventilation systems, rather than cold air entering (and warm air escaping) uncontrolled through unwanted or unseen gaps.

Airtightness is typically measured in two units: air changes per hour (ACH) or n50 and air permeability ($m^3/hr/m^2$) or q50. In the case of most Irish dwellings, there's usually only a fractional difference between the q50 and n50 scores, but for larger buildings – where the geometries tend to be more complex – the q50 and n50 scores often bear no comparison.

The smaller the airtightness figure the better. The rigorous passive house standard demands an n50 of 0.6 or less. Under Irish building regulations new homes must be tested to surpass a mediocre q50 of 7. (Don't let this fool you though – compliance means hitting a 60% energy saving target, and a q50 of 7 won't help you get there. We've yet to see a compliant building built anywhere near that leaky).

argon A stable, non-reactive gas that is often used to fill the space between window panes in double and triple-glazed windows because it is an effective insulator

blower-door test This is used to work out a building's airtightness. A fan mounted to an external door is used to pressurise or depressurise the interior of the building, forcing air in or out through any gaps or cracks. The house's airtightness is determined by measuring the force needed to maintain a certain pressure difference (typically 50 pascals) between the inside and outside of the house.

coefficient of performance (COP) This measures the energy efficiency of certain heating and cooling appliances, such as heat pumps. COP is the ratio of useful energy output (heating or cooling) to the amount of energy put in, so a heat pump with a COP of 4 to 1 puts out four times as much energy as it uses. The higher the COP, the more efficient the device. Note that COPs are measured at particular delta Ts or temperature differences before and after the heat pump's boosted the temperature. While there are EN standards which determine what delta Ts heat pumps must be tested to – usually coming up with an average value based on several conditions – it's important to know what COP your heat pump will give at the typical delta Ts you'll need to achieve.

ground granulated blastfurnace slag (GGBS) A steel industry by-product that is used instead of traditional portland cement for 'eco' and 'green' cements and concretes. Because GGBS is essentially a by-product of an existing industry, it's considered to have a much lower embodied energy than portland cement.

passive house / passivhaus Passive house is a rigorous ultra-low energy building standard. Developed in Germany in the early 1990s, the standard has led to the design of buildings that are so energy efficient they don't require conventional heating systems.

Designed to be extraordinarily good at retaining heat, passive houses make the most of free heat wherever possible – whether in the form of passive solar gains through windows, metabolic gains from occupants, or recovering most of the heat that would otherwise be lost venting hot, wet air from cooking or washing.

To be certified by the Passive House Institute, buildings must meet three strict criteria:
1) A space heating demand of no more than 15 $kWh/m^2/yr$, as calculated using PHPP. An alternative here is if the specific heat loads is 10 w/K or less, though this appears to be at the discretion of the certifier.
2) A primary energy demand of no more than 120 $kWh/m^2/yr$ for ALL domestic energy use – unlike BERs which don't deal with energy use from electrical appliances.
3) An airtightness of no more than 0.6 ACH at 50 Pascals.

These targets are all rounded down. To be more precise, the airtightness target is actually 0.649 ACH, as the institute only look one place beyond the decimal point. By the same token, the space heating and primary energy demand are actually 15.49 and 120.49 $kWh/m^2/yr$ respectively. It's best to aim higher though to allow for things going wrong, so whatever you do don't tell your builder!

The term passive house is often used to describe buildings that, while not being officially certified by the institute, still appear to be close to the standard. There's a distinction to draw here between buildings which have been run through PHPP, hit all the main targets and look like they could be certified, buildings which have been designed using other software but use the sorts of specifications that abound in certified passive houses, and people who misguidedly use passive house as a generic term for any vaguely energy efficient measures.

Passive House Planning Package (PHPP) A software programme developed by the Passive House Institute that's used to design and test buildings aiming to meet the passive house standard. It's often used as a design tool for low energy buildings even if the architect or builder is not specifically aiming to meet the standard.

thermal mass The capacity of a building material to store heat. Materials with a high thermal mass absorb heat, store it and then release it later on. This can help to smooth out extremes in temperature inside a building, helping to maintain a comfortable internal environment and reduce the need for heating. Heavyweight construction materials like concrete and bricks have more thermal mass than lightweight materials like timber. Thermal mass is particularly important in climates where there is a large difference between daytime and night-time temperatures, which isn't the case in the temperate Irish climate, though thermal mass can still be beneficial in Irish building – it's of most benefit when buildings are well-insulated and occupied consistently throughout the day.

U-value The U-value of a material is the rate of heat loss through that material. The lower the U-value of a material, the less heat can pass through it and the better it is at insulating. U-values are measured in watts per metre squared kelvin (W/m^2K).

As of December 2011, Part L of the Irish building regulations demands that new homes have a minimum "backstop" external wall U-value of 0.22 W/m^2K, but the Department of the Environment has warned that in addition to a range of other energy efficiency measures, U-values for walls, floors, windows and roofs may need to be far better than the backstops to achieve the mandated 60% energy reduction compared to 2005 regulations. The department's example approach to Part L compliance showed wall U-values of 0.15, the sort of level that's typically associated with passive houses.

If you're building passive, near passive or Part L compliant, we have the answer

When you're building your new home, think passive. At Stanhurst, we can work with your designs to build the ultra low energy home that's right for you. Whether you want blockwork, timber frame or insulating concrete formwork, we have the knowhow to ensure your home is as airtight, warm and healthy as possible.

Key elements in all Stanhurst Passive Homes:

- Air tightness
- Heat recovery ventilation
- Passive windows
- Orientation (south facing)
- Insulation
- Cold bridge elimination

WWW.PASSIVEHOUSEDUBLIN.COM
WWW.PASSIVEHOUSEWICKLOW.COM

Stanhust Ltd. - Passive House, Suite 4, Eden Gate Centre, Delgany, Co. Wicklow
t: 01 287 4040 I f: 01 287 5252 I m: 086 2542456 I e: info@petercrossan.com

"Stanhurst Limited got the job for our house after a competitive tendering process. The project was finished on time and it passed the Passive House standard. The detail and workmanship they rendered were high quality and to the best standard. The employees are all professional and were accommodating to our needs. Everyone worked hard in achieving the requirements involved in the project. In addition, Peter Crossan's attention to detail is beyond the utilitarian, he has an excellent eye as to what is aesthetically pleasing and provided excellent advice.

Overall the whole experience was far above our expectations and we would highly recommend them for any passive house or any type of house construction."

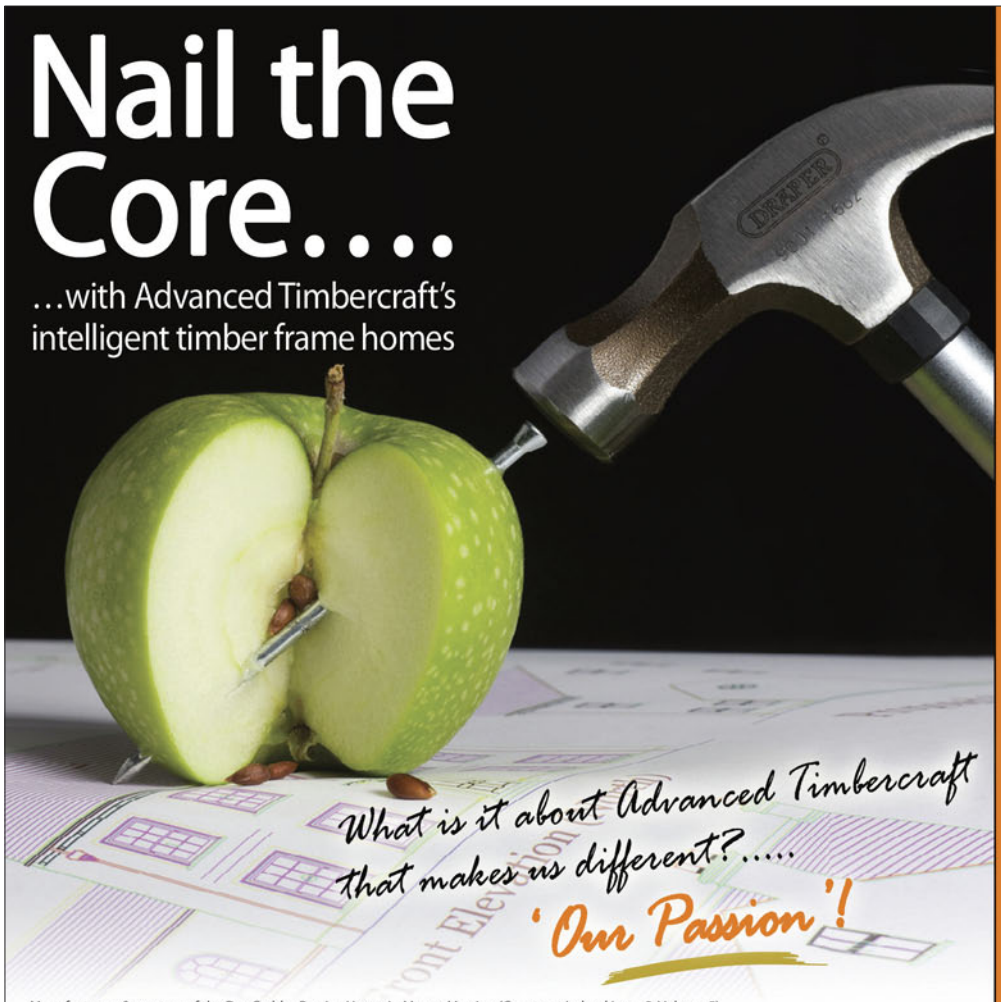
MICHAEL MYBURGH & LEONTINE BINCHY (Enniskerry, Co. Wicklow)

Think passive. Think Stanhurst.

PASSIVE HOUSE
BY STANHURST LTD.

Nail the Core....

...with Advanced Timbercraft's intelligent timber frame homes



Manufacturers & erectors of the Des Crabbe Passive House in Mount Merrion (Construct Ireland Issue 8 Volume 5)

What is the core of your home? It's the element that you can't change or tweak, it needs to be right first time.

Allow Advanced Timbercraft, with our knowledge and experience of low energy and passive house construction to manufacture and erect our BESPOKE timber frame for you.

Consultation & Quotation Free of charge

ADVANCED TIMBERCRAFT
Intelligent timber frame homes

10 Brown's Road, Newtownabbey,
Co Antrim, BT36 4RN
T: +44(0)28 90838951
www.advancedtimbercraft.com
E: eileen.orr@advancedtimbercraft.com

Find us on Facebook

the magazine you've been waiting for is here!

passive house+

eco build & upgrade

subscribe for only €25*!

subscribe to Passive House Plus **6 issues delivered to your door**

Name: _____

Position: _____

Company: _____

Address: _____

Tel: _____ Fax: _____

Email: _____ Web: _____

Type of business: _____

Number of copies required: ☐ Signature: _____ Date: _____

☐ I enclose a cheque **€25 (€45 overseas)** made payable to Temple Media Ltd.

OR please debit my: ☐ Visa ☐ Master card

Card number: ☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐ CCV no: ☐☐☐

Expiry date: ☐☐ / ☐☐

Name of cardholder: _____ Signature: _____

Tel: 01 210 7513 Email: oisin@passivehouseplus.ie Subscribe online at www.passivehouseplus.ie

Construct Ireland subscriber? We will send you Passive House Plus until your subscription expires, unless you notify us otherwise.

ISSUE 1 VOLUME 1

TEMPLE MEDIA LTD., PO BOX 9688, BLACKROCK, CO DUBLIN, IRELAND

MUNSTER JOINERY

Est. 1973

THE PROFESSIONALS YOU CAN TRUST

GROUND BREAKING U-VALUES **FROM AS LOW AS 0.47W/M²K**

Our PassiV uPVC and Aluclad ranges have been certified as a "Passive house suitable" component by the Passive House Institute – the German based global certification authority for passive housing.

www.munsterjoinery.ie

Lacka cross, Ballydesmond, Mallow, Co. Cork. T. 064 7751151 F. 064 7751312 E. info@munsterjoinery.ie

IRELAND'S LEADING HIGH PERFORMANCE ENERGY SAVING WINDOW & DOOR MANUFACTURER

A new generation of heat pumps
DESIGNED FOR EARTH

UNIPIPE IRELAND LTD
UNDERFLOOR - RENEWABLES

NIBE

NEW

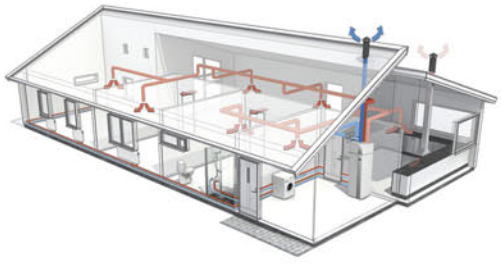
Fresh air's free

NIBE™ F2026 OCH F2300 AIR/WATER HEAT PUMPS

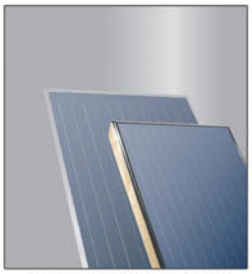
Use your heat pump when you need it. When it gets really cold outside. We've increased performance even more and present our air/water heat pumps, NIBE F2026 and NIBE F2300, both specially developed for extremely cold climates.

There's a whole range of accessories and the possibility to complement the system with our indoor modules. NIBE F2026 and F2300 reduce your energy costs by up to 75%. And they're incredibly quiet.

Nibe Exhaust Air Heatpumps – the **all in one** packaged unit for **passive and low energy homes** handling **ventilation, hot water & space heating - Connects to either radiators or floor heating.**




Unipipe Evacuated Tube Collector


Sonnenkraft Flat Plate Collector


Contura Stoves


Solar Tanks 'Plug & Play'


Underfloor Heating

HEAT PUMP
Association of Ireland

www.unipipe.ie

Unipipe Ireland Ltd
40 Southern Cross Business Park, Bray, Co. Wicklow, IRELAND
Tel: +353 - 01-2864 888 I Fax: +353 - 01-2864 764
Showrooms by appointment

Unipipe Underfloor Heating & Controls
Geothermal Heatpumps
Exhaust Air Heatpumps
Air to Water Heatpumps
Sonnenkraft Solar Systems


Wood Burning Stoves from Contura, Handol & Seguin


Air-to-water Heat Pumps


Split Heat Pumps


EcoFlex


Underfloor Heating